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ABSTRACT

The major goal of the Comprehensive Instructional Management System (CIMS) for mathematics is to provide classroom teachers in New York City with a well-structured, objective-based curriculum. This second part of the manual for Level 2 includes modules for 12 topics: numbers and numeration; addition of whole numbers; subtraction of whole numbers; multiplication of whole numbers; division of whole numbers; fractions; geometry; measurement; algebraic concepts; graphs, probability, and statistics; problem solving; and review. The instructional sequence is listed, followed by the content listed by topic. Reinforcement of previously learned skills is incorporated where appropriate. Then, each objective is taken up in turn, with vocabulary, activities for getting started, and teaching strategies described. The pupil's worksheets are interspersed. Resource materials, symbols, and equipment lists are included. (MNS)

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CIMS

COMPREHENSIVE INSTRUCTIONAL MANAGEMENT SYSTEM

A Cyclical Mathematics Curriculum

PART 2—TEACHER

SE 047 531

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FOREWORD

The Comprehensive Instructional Management System (CIMS) is a unified mathematics curriculum for grades K-7. The curriculum is cyclical in design, and reflects the most recent New York City and New York State guidelines.

Utilizing the experience of our system's teachers, we have developed a teacher-designed curriculum that includes a rich selection of classroom-tested successful mathematics activities. The major goal of the CIMS mathematics project is to provide the classroom teacher with a well-structured, objective-based curriculum. All objectives are supported by a variety of strategies. Student mastery of these objectives is readily diagnosed through the system's testing component.

The curriculum format is structured to allow the teacher to determine the ability level of the students in the topic under study, and to permit the students to move forward at their individual rates. Each module of instruction provides the teacher with a set of related performance objectives. These objectives are supported by activities which probe and develop the students' readiness to undertake new skills and concepts. Further reinforcement is given to mastery of the objectives through accompanying student workbooks.

It is hoped that this curriculum will not only assist teachers in developing vital mathematics instruction, but will serve to expand and enrich students' mathematics skills.

Charlotte Frank

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The Comprehensive Instructional Management System (CIMS) was developed as a project of the Division of Curriculum and Instruction, Charlotte Frank, Executive Director. Mr. Bernard Mecklowitz, Community School Superintendent CSD 1; Dr. Peter Negroni, Community School Superintendent CSD 12; Dr. Harvey Garner, Community School Superintendent CSD 18; Carlos Edwards, Community School Superintendent CSD 23, and Joseph Pacheco, Community School Superintendent CSD 32 supervised the overall development of the CIMS program within their respective districts.

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INTRODUCTION

The Comprehensive Instructional Management System (CIMS) is a teacher-designed educational delivery system composed of a curriculum, a testing component and a computer managed reporting system.

Designed to support mathematics instruction in the classroom, CIMS provides a comprehensive cyclical mathematics curriculum for grades K through 7. Each manual describes the curriculum for a single level or grade. Teacher curriculum developers from elementary, intermediate and senior high schools utilized the most current New York City and New York State guidelines in formulating the curriculum's modules and sequence.

Curriculum Topics

The CIMS mathematics curriculum has been organized into the following 14 topics:

.01 Numbers and Numeration
.02 Addition of Whole Numbers
.03 Subtraction of Whole Numbers
.04 Multiplication of Whole Numbers
.05 Division of Whole numbers
.06 Fractions
.07 Decimals
.08 Integers
.09 Geometry
.10 Measurement
.11 Algebraic Concepts
.12 Graphs, Probability, Statistics
.13 Problem Solving
.14 Review

Modules of Instruction

The CIMS curriculum is organized into modules or groupings of similar skills or understandings. Each module has a suggested period of duration for student mastery, a listing of new skills to be mastered by the student in the form of performance objectives, a section devoted to vocabulary, terms and symbols, getting started activities which serve as prerequisite skills in preparation for undertaking new objectives, strategies for teaching the new skills and student activities for providing reinforcement for the newly learned objective. Note that the lesson duration is included only as a guideline to the teacher for planning purposes. The actual time required for each module will vary from class to class and from child to child depending on the needs of the students and the teacher's judgment.

Priorities of Performance Objectives

There is an order of priority to be recognized in teaching the content presented in the CIMS NEW YORK CITY MATHEMATICS CURRICULUM. Performance objectives with the greatest priority are so basic that unless the student acquires a satisfactory degree of competency in them, the student cannot progress. Such topics are marked A and mastery by all pupils is essential.

Performance objectives marked B are required to be presented to all students. Mastery is not expected at this time. These objectives will be developed further and reinforced later.

Performance objectives marked C are of special interest. These should be taught to increase positive attitudes towards mathematics.

Summary:
- A - Mastery of this objective is essential for progress. Opportunities for reinforcement should be provided throughout the school year.
- B - These objectives are to be taught to all pupils. Mastery is not essential at this time because the topics will be further developed and reinforced.
- C - Objectives of special interest.

Topic Tab Key

01. Numbers and Numeration

02. Addition of Whole Numbers

03. Subtraction of Whole Numbers

04. Multiplication of Whole Numbers

05. Division of Whole Numbers

06. Fractions

07. Decimals

08. Integers

09. Geometry

10. Measurement

11. Algebraic Concepts

12. Graphs, Probability, Statistics

13. Problem Solving

14. Review

Module Coding Key

2.06.01.02 A

Grade level
(Grade 2)

Topic number
(.06 Fractions)

Module ranking within topic and level
(Fractions: Fifths, Sixths and Tenths)

Performance objective within this module
(The student will be able to
separate a concrete object into
fifths, sixths and tenths and
identify the parts as equal.)

Priority
(See page xiv)

INSTRUCTIONAL SEQUENCE DESCRIPTION

An instructional sequence is given in list form on the following pages for this level. The sequence has been arranged to reflect what is considered the most effective presentation of the mathematics curriculum. Each module in the list is described by its unit number, module number, title, and page location.

The CIMS tests are integrated within the manual sequence. The test number is located in the first column. Each test is designed to assess priority objectives from the preceding modules. The tests are used to determine student mastery of specific performance objectives within these modules and appear in a multiple choice format. Each performance objective code number preceded by an * indicates that the performance objective is not tested on a CIMS test.

INSTRUCTIONAL SEQUENCE - LEVEL 2

TEST NUMBER	UNIT NUMBER	MODULE NUMBER	TITLE	PAGE NUMBER
	1	2.10.01	Time - months and years	1
	2	2.14.01	Recognize and name whole numbers 0 through 100 by ones	3
	3	2.14.02	Recognize and name whole numbers 10 through 100 by tens	4
	4	2.01.01	Count hundreds through ten hundred (1000)	5
2.01	5	2.01.02	Read and write standard numerals (100 through 1000)	6
	6	2.01.03	Count by tens and fives to 1000	7
	7	2.01.04	Relation symbols =, <, >	8
2.02	8	2.13.01	Locate information	9
	9	2.12.01	Data - collect, tabulate, arrange, and compare in tables	11
	10	2.14.03	Addition and subtraction facts	12
	11	2.10.02	Quarters, half-dollars	13
	12	2.01.05	Even and odd numbers	14
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	15	2.11.01	Open sentences	17
	16	2.01.07	Place value through 999	18
	17	2.10.03	Money - dollars	19
	18	2.01.08	Ordinal numbers eleventh through thirty-first	20
	19	2.09.02	Explore properties of a circle, square, rectangle, and triangle	21
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	21	2.03.01	Subtraction of a 2-digit number from a 3-digit number without regrouping (exchange)	25

INSTRUCTIONAL SEQUENCE - LEVEL 2

TEST NUMBER	UNIT NUMBER	MODULE NUMBER	TITLE	PAGE NUMBER
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	23	2.03.02	Subtraction of a 3-digit number from a 3-digit number without regrouping (exchange)	28
	24	2.13.02	Guess and check	29
	25	2.13.03	Use data	30
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INSTRUCTIONAL SEQUENCE - LEVEL 2

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INSTRUCTIONAL SEQUENCE - LEVEL 2

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LEVEL 2

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DO YOU REMEMBER? - LEVEL 2, PART 2

DO YOU REMEMBER is an added feature to the CIMS manual. It is located at the bottom of some worksheet pages and allows students to reinforce previously learned skills in order to support a cyclical curriculum.

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2.13.02.02	Check guesses against problem conditions in numerical problems..........................	33a
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DO YOU REMEMBER? - LEVEL 2, PART 2

P.O. NUMBER	PERFORMANCE OBJECTIVE DESCRIPTION	WORKSHEET PAGE NUMBER
2.02.04.02	Add a 2-digit number and a 1-digit number with regrouping (exchange) ones to tens and check..................................	47a
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DO YOU REMEMBER? - LEVEL 2, PART 2

P.O. NUMBER	PERFORMANCE OBJECTIVE DESCRIPTION	WORKSHEET PAGE NUMBER
2.02.05.03	Solve story problems related to skills learned in this module; addition of 2-digit numbers with regrouping (exchange) ones to tens	57a
2.14.04.02	Identify and write fractional notation for halves through $\frac{2}{2}$, fourths through $\frac{4}{4}$, and thirds through $\frac{3}{3}$	57b
1.10.14.03	Read time on a standard and digital clock on the half-hour	60a
2.04.02.04	Demonstrate that multiplication is the process of repeated addition of like addends.	60c
2.05.03.03	Solve story problems related to skills learned in this module; division facts for fives through 25	63a
2.12.03.01	Predict the outcome of three equally likely events	63c
2.10.01.02	State what last month was and what next month will be	65a
2.09.02.04	Recognize and list some properties of a triangle (three sides, three corners)	65b
2.02.05.02	Add two 2-digit numbers with regrouping (exchange) ones to tens and check	66a
2.02.02.03	Add money through $9.99 without regrouping (exchange) and check	67a
2.06.02.01	Separate a group though 10 objects into two equal groups using fractional parts	67b
2.05.05.03	Solve story problems related to skills learned in this module; division facts for fours through 20	67c

DO YOU REMEMBER? - LEVEL 2, PART 2

P.O. NUMBER	PERFORMANCE OBJECTIVE DESCRIPTION	WORKSHEET PAGE NUMBER
2.10.12.03	Solve story problems related to skills learned in this module; time-quarter hour, minutes, and seconds........................	68b
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1.02.04.02	Identify the commutative property in addition with sums through ten...............	70a
2.02.05.03	Solve story problems related to skills learned in this module; addition of 2-digit numbers with regrouping (exchange) ones to tens..	71b
2.04.03.02	Count by threes through 15..................	72b
2.02.07.02	Add a 3-digit number and a 2-digit number with regrouping (exchange) and check.........	74a
2.10.11.02	Solve story problems related to skills learned in this module; identify a group of twelve objects as a dozen and six objects as a half dozen............................	75a
2.05.06.03	Demonstrate related facts for number families....................................	76a
2.10.13.01	Identify the relationships among cup, pint, and quart..................................	77a

2.10.04 TEMPERATURE - CELSIUS AND FAHRENHEIT THERMOMETERS

(1-2 lessons)

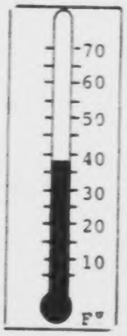
PERFORMANCE OBJECTIVES

The student will be able to...

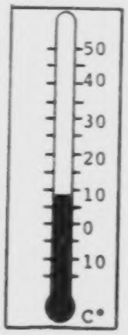
2.10.04.01B explain the meaning of the word degree and identify its symbol;
e.g.,

a unit for measuring temperature
20°

2.10.04.02B recognize and read a Fahrenheit thermometer to the nearest five degrees, ten degrees;
e.g.,



2.10.04.03B identify the degree scale as shown on a Celsius thermometer and read to the nearest five degrees, ten degrees.
e.g.,



2.10.04

VOCABULARY

TERMS	SYMBOLS
degree	°
Fahrenheit	
Celsius	

GETTING STARTED

Prepare and display various pictures of different weather conditions, e.g., winter - snow scene / skiing / sledding..., spring - planting / playing outdoors / trees in bloom..., summer - swimming /sailing / playing at the beach... fall - leaves turning colors /raking leaves. Show each picture to the class. Say, "What is happening in this picture? What is the weather like? Do you think it is hot or cold? Why do you think it is hot?...cold?" Elicit the various ways of depicting the temperature, e.g., clothing. Elicit what changes occur in our homes when the temperature goes up or down.

Prepare and display a set of flashcards, each with words that represent hot or cold objects.
e.g.,

ice cream
coffee
snow
hot dog
soup
juice

Hold up each card and say, "Which word, hot or cold, better describes this object?" Place the cards on the chalkboard ledge. Elicit which objects are hotter/colder than others.

Repeat this procedure until the students demonstrate a good understanding of hot, hotter, cool, cold and colder.

2.10.04

2.10.04.01 **explain the meaning of the word degree and identify its symbol**

STRATEGY 1: Prepare and display a ribbon thermometer. Say, "Who can tell us what this is? What are the uses of a thermometer? (A thermometer tells us how hot or cold it is.) Has your mother ever used a thermometer? Who can tell us what they see on the thermometer? (lines, numbers) The numbers on the thermometer tell us how hot or cold it is. When we know how hot or cold it is, we know the temperature. A thermometer measures temperature. We measure temperature in degrees." Adjust the ribbon to read eighty degrees and say, "It is eighty degrees." Write 80° on the chalkboard. Say, "The little circle tells us that we are talking about degrees and measuring temperature."

STRATEGY 2: Prepare and display a ruler, a scale, and a thermometer. Hold up each object and ask the students to identify it. Say, "How are all three objects alike? (They are all used to measure something.) What does each one measure? If we measure the length of a strip of paper, we say that the paper is ___ inches long. If we weigh a book we say that the book weighs ___ pounds. If we want to know what the temperature is right now (adjust ribbon to read 70 degrees), we say that it is seventy degrees. Degrees are a measure of temperature." Write 70° on the chalkboard. Say, "This is how we write seventy degrees. The little circle tells us we are talking about degrees."

2.10.04

2.10.04.02 **recognize and read a Fahrenheit thermometer to the nearest five degrees, ten degrees**

STRATEGY 1: Prepare and display a Fahrenheit thermometer. Explain to the students that on a Fahrenheit thermometer, the temperature at which water will boil is 212°, and the temperature at which water will freeze is 32°. Point out other temperatures on the thermometer, e.g., body temperature, cold day, hot day. Adjust the ribbon to help the students see the change in temperature. Set the ribbon to a temperature, e.g., 63°. Say, "The temperature falls between 60° and 65°. To which mark is it closer? (It is closer to 65°.) We can say the temperature is about 65 degrees. After sufficient practice in reading temperatures to the nearest five or ten degrees, reverse the procedure by naming a temperature, e.g. 7°, and asking a student to adjust the ribbon to show that temperature to the nearest ten degrees.

STRATEGY 2: Prepare a demonstration Fahrenheit thermometer, red strips of paper, scissors, and copies of the Fahrenheit thermometer found on page 32a. Display the thermometer and say, "What name is given to this object?" What are its uses? This thermometer is called a Fahrenheit thermometer. On this thermometer water freezes at 32° (Demonstrate.) and boils at 212° (Demonstrate.)." Change the temperature by moving the paper ribbon. Say, "When the top of the red ribbon is between two blank lines, we read the temperature which is nearest the top of the ribbon." Ask a student to read the temperature. Repeat this procedure until each student has had a chance to respond.

STRATEGY 2: cont'd

Distribute the copies of the thermometer, red strips of paper, and scissors to each student or group of students. Guide the students in creating their own Fahrenheit thermometers.

Ask the students to show specific temperatures at five and ten degree intervals on the thermometers by sliding the red strip of paper up or down.

Helpful Hint: For greater durability, thermometers can be backed with oaktag.

2.10.04.03 identify the degree scale as shown on a Celsius thermometer and read to the nearest five degrees, ten degrees

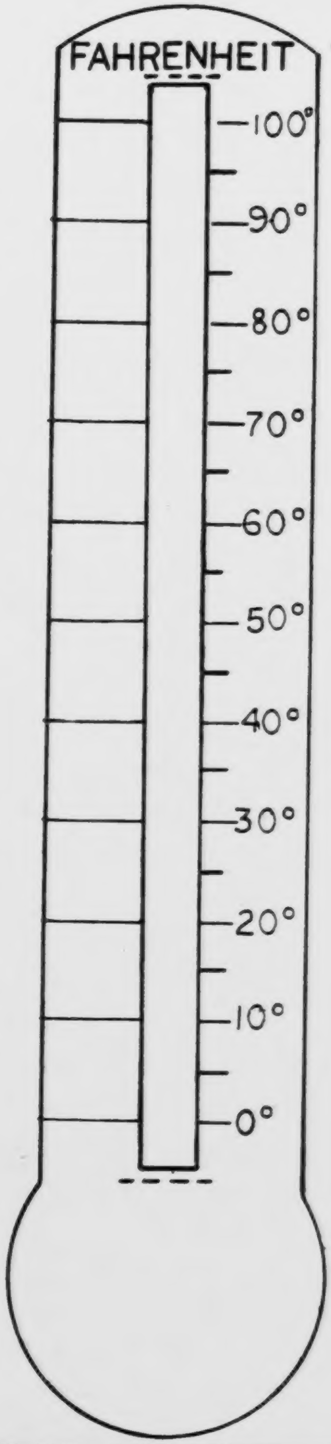
STRATEGY 1: Prepare and display a Celsius thermometer with a movable ribbon. Explain to the students that there is another thermometer used for measuring temperature that is called a Celsius thermometer. Say, "You have already seen a Fahrenheit thermometer. How is this Celsius thermometer like the Fahrenheit thermometer? How is it different?" Discuss the freezing (0°) and boiling (100°) points of water on a Celsius thermometer. Adjust the ribbon on the thermometer and elicit other temperatures from the students, e.g., body temperature, hot day, cold day. The temperature should be read as ___ degrees Celsius. When sufficient practice has been given, ask the students to adjust the ribbon to correspond with a given temperature. Practice reading and demonstrating temperatures to the nearest five or ten degrees.

STRATEGY 2: Adapt Strategy 2 used in P.O. 2.10.04.02. Substitute Celsius thermometer found on page 32C.

P.O. 2.10.04.02

NAME:______________________________ CLASS:__________ DATE:________

Glue the thermometer to a piece of oaktag or cardboard. Cut a slot at each dotted line. Cut a strip of paper, half red and half white, to fit in the slots to make your thermometer.

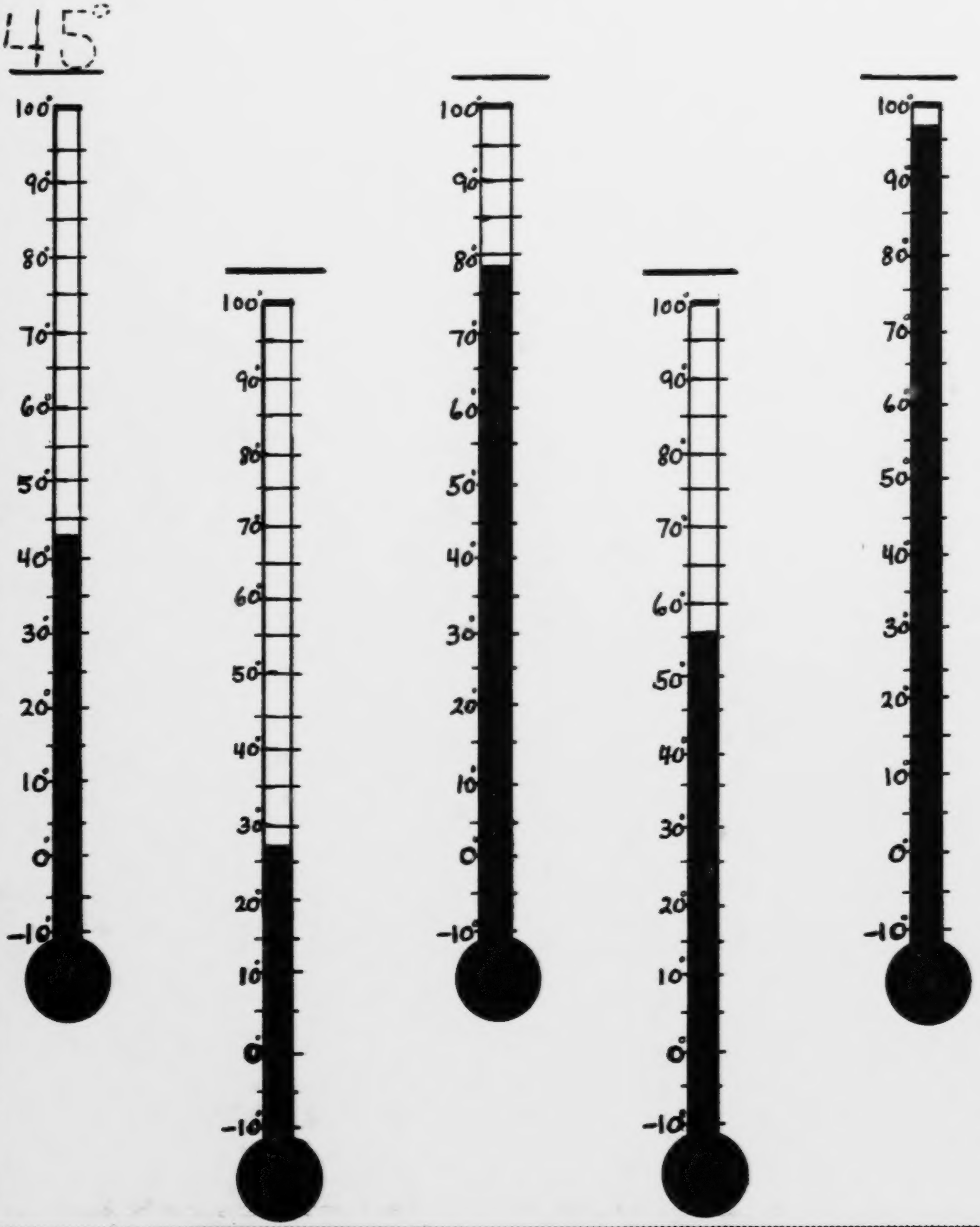

FAHRENHEIT
100°
90°
80°
70°
60°
50°
40°
30°
20°
10°
0°

P.O. 2.10.04.02

NAME:____________________________________ **CLASS:**__________ **DATE:**________

Write the temperature that each Fahrenheit thermometer shows to the nearest five or ten degrees.

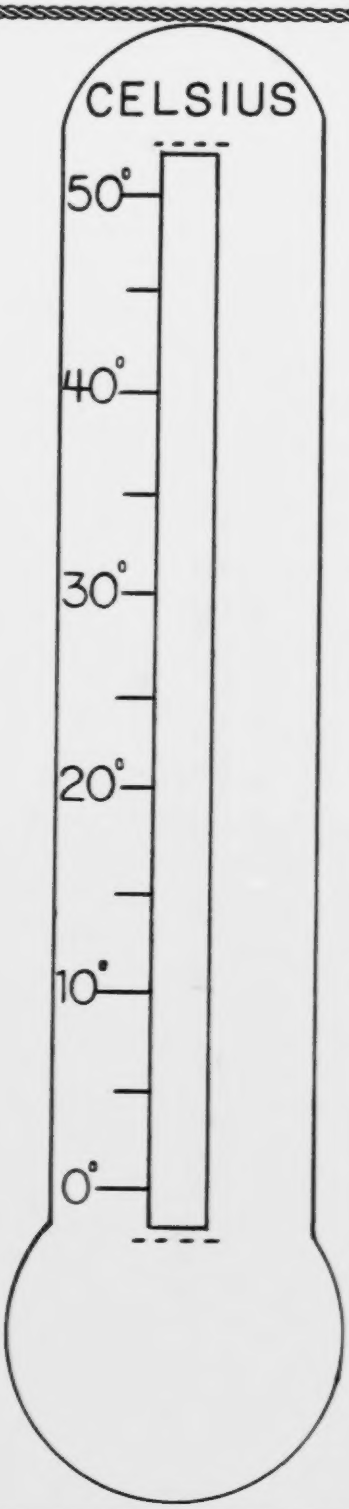
What temperature is shown on each thermometer?


45°
100°
90°
80°
70°
60°
50°
40°
30°
20°
10°
0°
-10°

P.O. 2.10.04.03

NAME:____CLASS:_________DATE:_______

Glue the thermometer to a piece of oaktag or cardboard. Cut a slot at each dotted line. Cut a strip of paper, half red and half white, to fit in the slots to make your thermometer.



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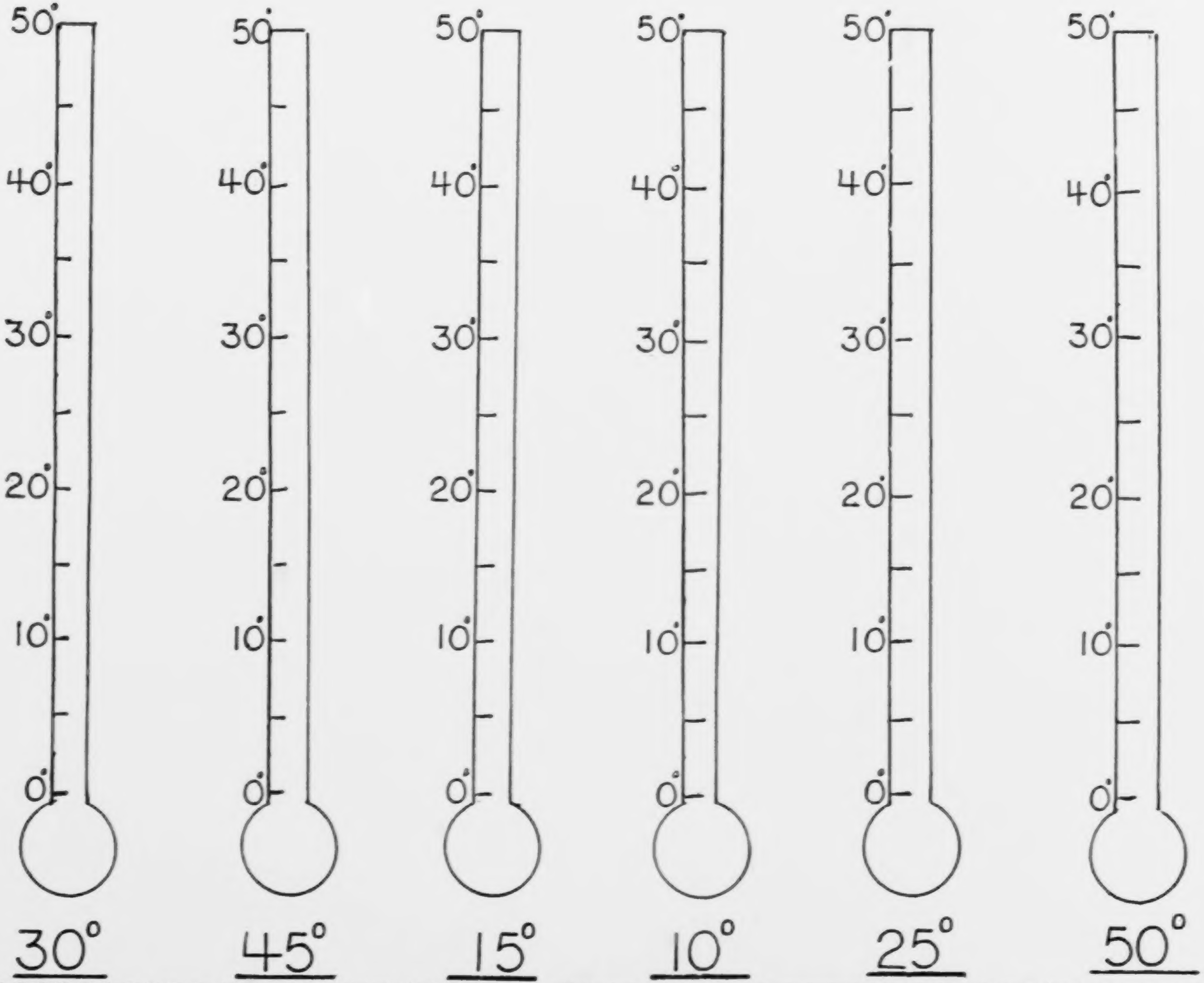
P.O. 2.10.04.03

NAME: ____________ **CLASS:** ______ **DATE:** ______

Color each Celsius thermometer to show the correct temperature.

Fill in each thermometer to show the correct temperature.



30° 45° 15° 10° 25° 50°

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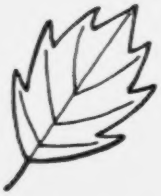
2.09.03 SYMMETRY

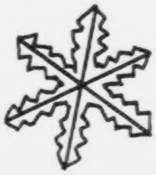
(1 lesson)

PERFORMANCE OBJECTIVES

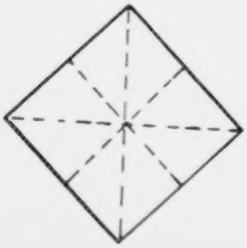
The student will be able to...

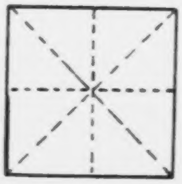
2.09.03.01A determine whether objects have lines of symmetry;
e.g.,
leaves, snowflakes





2.09.03.02A find more than one line of symmetry.
e.g.,





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2.09.03

VOCABULARY

TERMS

symmetry
square
circle
rectangle
line of symmetry

GETTING STARTED

Prepare and display oaktag circles, squares, triangles and rectangles. Ask the students to identify each shape. Draw a large dot diagram to represent a square geoboard. Say, "Who can connect the dots to construct a triangle? ...square? ...rectangle? The circle does not have straight sides, therefore these dots could not be used to make a circle."

Prepare and distribute circles, squares, triangles and rectangles, scissors and construction paper to each student or group of students. Point to various objects in the classroom and ask the students to identify the shape of each object. Say, "Trace each shape and then cut it out. Fold your shape in half and then cut along the fold. (Demonstrate) How many shapes do you now have? See if the two shapes match exactly by placing one over the other." Explain to the students that if the two pieces match exactly, we can call the fold line, the line of symmetry. Therefore a line of symmetry separates a shape into two parts which match exactly.

Repeat this procedure several times so that each student has an opportunity to experiment with different shapes to find the line of symmetry.

2.09.03

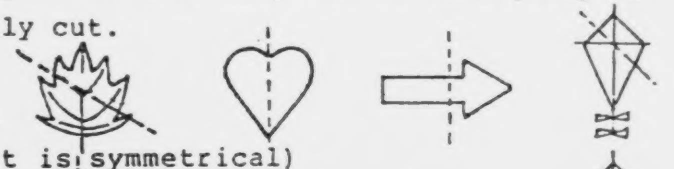
2.09.03.01 **determine whether objects have lines of symmetry**

STRATEGY 1: Prepare a heart, a butterfly, a Christmas tree, and the letter X. Say, "We have drawn lines of symmetry on circles and squares. How did we determine the lines of symmetry of a circle or a square? (We folded the circle or square and if the two parts matched exactly then the fold was a line of symmetry.) Let's see if other objects have lines of symmetry." Display each shape. Select students to fold the shapes to determine if they have lines of symmetry. Ask the students to indicate the fold line and to say why there is a line of symmetry. (If the two parts match exactly, then the fold line is a line of symmetry.)

STRATEGY 2: Prepare four copies of each of the following objects: a heart, an arrow, a kite, and a leaf. Cut each object so that only one in each group is symmetrically cut.

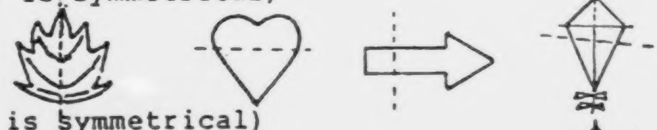
e.g.,

Group 1:



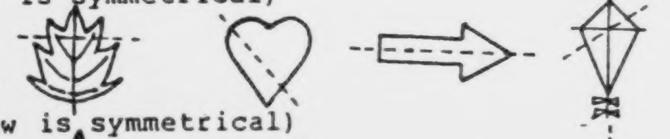
(heart is symmetrical)

Group 2:



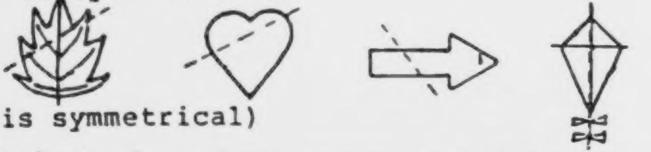
(leaf is symmetrical)

Group 3:



(arrow is symmetrical)

Group 4:



(kite is symmetrical)

Divide the students into four groups and distribute one set of objects to each group. Say, "Each group

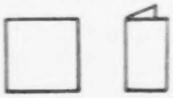
STRATEGY 2: cont'd

has the same objects. Each object has been cut into two parts. Put your pieces together to see which object is cut symmetrically. Ask a student from each group to select the symmetrically cut object and prove that it is symmetrical. Ask another student to select an object which is not cut symmetrically (asymmetric). Repeat with the other groups. Collect and redistribute the objects. Repeat the above procedure.

2.09.03.02 **find more than one line of symmetry**

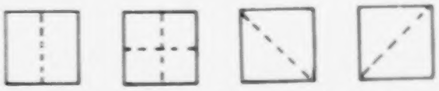
STRATEGY 1: Prepare a set of construction paper squares and a class set of smaller squares. Ask the students to identify the shape. Fold the square in half.

e.g.,



Say, "Into how many equal parts did I fold this square?" Unfold the square and draw a thick line on the fold. Say, "This fold line is called a line of symmetry. A line of symmetry separates a shape or an object into two parts which match exactly." Refold the square and make another fold.

e.g.,

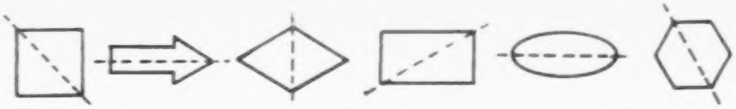


Say, "Is this another line of symmetry?" (Yes) "Why?" Distribute squares to each student. Say, "Fold your paper to make a line of symmetry. Draw a line on the fold and unfold the square. Practice finding the other lines of symmetry using the same shape. Be sure to draw a line each time the square is folded." Assist the students in finding four lines of symmetry.

2.09.03

STRATEGY 2: Prepare two of each of these shapes; a square (□), an arrow (⇨), a diamond (◇), a rectangle (▭), an oval (⬭) and a hexagon (⬡). Cut each shape in half along a different line of symmetry.

e.g.,



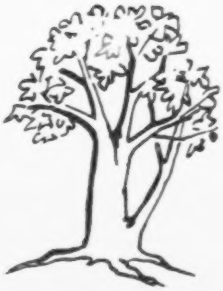
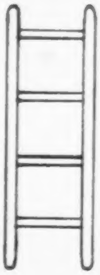
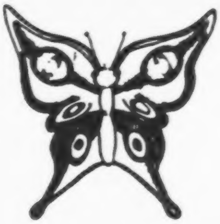
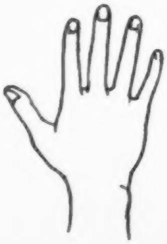
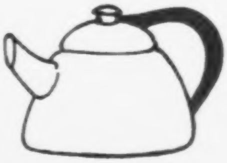
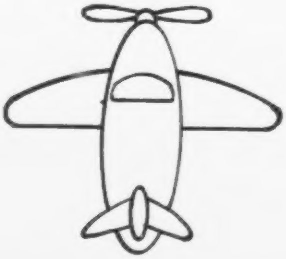
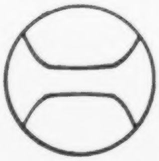
Divide the students into four groups. Distribute three different shapes to each group. Say, "Each shape has been cut symmetrically. Can you match the pieces to form the original shape?" Ask the students to match their pieces. Say, "Who has made a square?" Ask the two students with squares to display their two pieces. Say, "Hold the pieces so that they form a square. Are they the same when the pieces are together? (yes) Are they the same when the pieces are apart?" (yes) Ask the students who formed the squares to exchange one of their pieces with each other. Say, "Look at the two pieces you are now holding. Are they different? How?" (They were cut differently, one down the middle, one on the diagonal). Say, "A square has more than one line of symmetry. We can cut it into two matching parts in different ways." Repeat this procedure with the other shapes.

P.O. 2.09.03.01

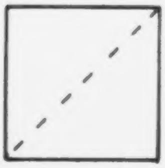
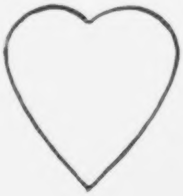
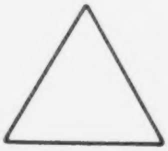
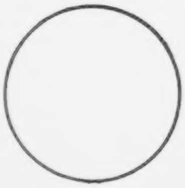
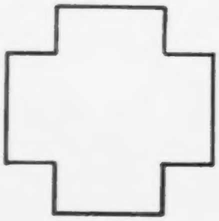
NAME: ______________________ CLASS: __________ DATE: ________

Follow the directions in each part.

Draw a ring around the objects that have a line of symmetry.

Draw a line of symmetry in each shape.

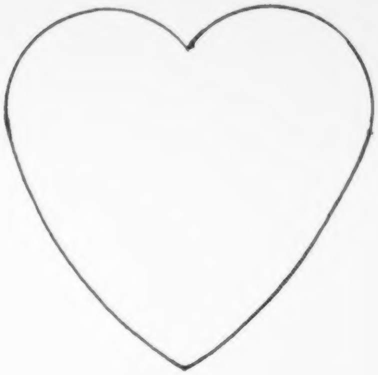
DO YOU REMEMBER?

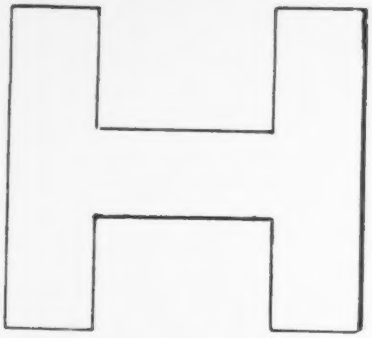
My number is between 40 and 60.
It is odd.
The sum of the digits is 11.
The number is ________.

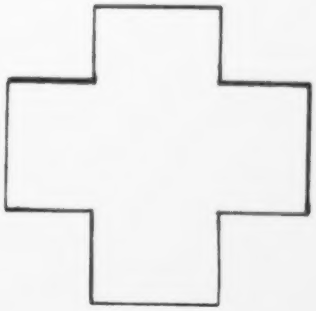
P.O. 2.09.03.02

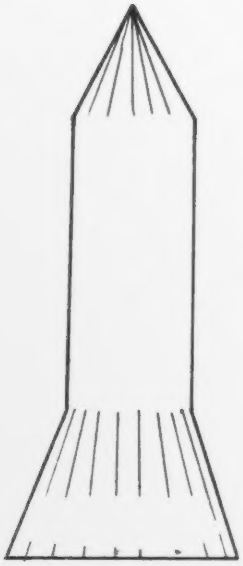
NAME: ______________________ CLASS: __________ DATE: ________

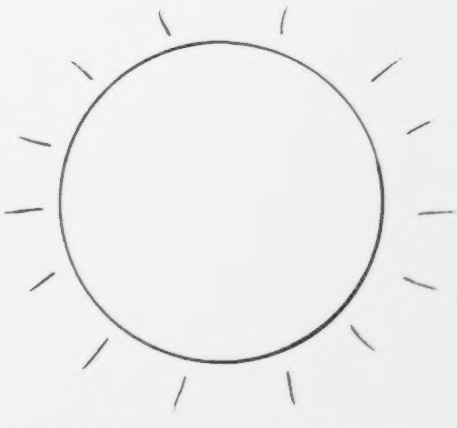
Draw the line(s) of symmetry for each shape. Circle the shapes which have more than one line of symmetry.

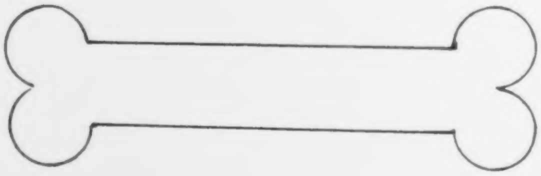












Ah

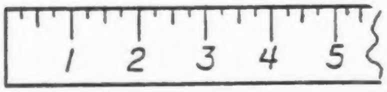
2.10.05 LINEAR MEASUREMENT - INCH AND FOOT

(1-2 lessons)

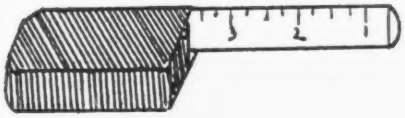
PERFORMANCE OBJECTIVES

The student will be able to...

*2.10.05.01A identify various standard tools of linear measurement;
e.g.,

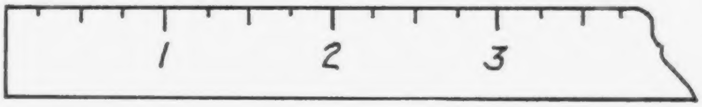


ruler

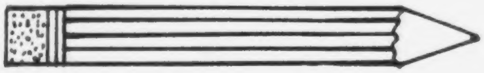


tape measure

2.10.05.02A identify an inch on a ruler;
e.g.,
Use a one-foot ruler to identify inch markings.



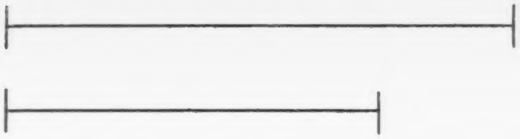
2.10.05.03B measure objects less than a foot in length to the nearest inch and record using the symbol for inch (");
e.g.,



3"

2.10.05.04B use the 12-inch ruler to measure a line segment;

e.g.,



= 3 in. long

= __ in. long

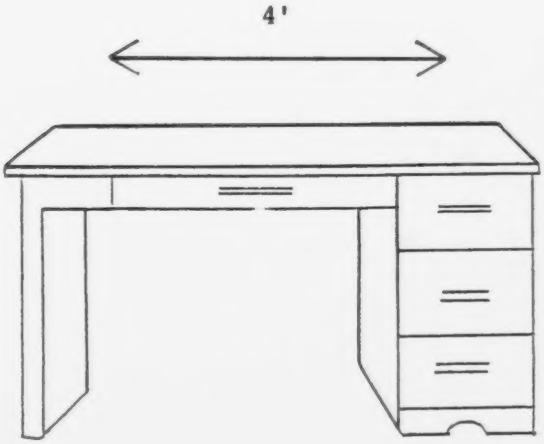
2.10.05.05B identify the relationships between inch and foot;

e.g.,

12 inches = 1 foot

*2.10.05.06A measure objects to the nearest foot and record, using the symbol for feet (').

e.g.,



2.10.05

VOCABULARY

TERMS	SYMBOLS
foot	'
inch	"
linear measurement	
line segment	
symbol	

GETTING STARTED

Select a student to help you measure your classroom. Say, "Put your back against the front wall and count the number of steps you take to reach the back wall. Walk the way you usually do and count carefully." Repeat this procedure with other students. Record all results on the chalkboard.

e.g.,

Name	Steps Taken
Susan	18 steps (paces)
Luis	15 steps
Robert	17 steps

Say, "Why did each student take a different number of steps?"

Mark off a section of the chalkboard. Say, "How many pencil lengths would be needed to measure this section of the chalkboard?" Ask several students, having different pencil lengths, to measure the section. Record each measure. Discuss why answers varied. (The pencils were different lengths.) Say, "If we had all used pencils of equal length, we would all have agreed on the number of pencil lengths needed to measure the chalkboard."

2.10.05

2.10.05.01 **identify various standard tools of linear measurement**

STRATEGY 1: Prepare a yardstick, ruler, tape measure, eraser, and pencil and place them in a large paper bag. Say, "What tools do we use to measure our height?" (ruler, yardstick, tape measure) Pick out a tool for measurement from this bag, tell us what it is, and whether it can be used to measure your height." Repeat this procedure until every tool has been identified and discussed.

2.10.05.02 **identify an inch on a ruler**

STRATEGY 1: Prepare and distribute twelve inch rulers with 1-inch markings to each student or group of students. Say, "In order to obtain one answer for the length of the chalkboard, we must agree on a unit of length. The unit of length we will learn about is called an inch. Place your thumb at the left end of the ruler (the zero mark) and your index (pointer) finger on number 1. How long is the space between your fingers? (one inch) This space is about one inch long."

Repeat this procedure for two through twelve inches.

STRATEGY 2: Prepare and distribute a strip of one inch graph paper and a twelve inch ruler to each student. Display a large ruler and graph paper. Demonstrate as you say, "Place your rulers on the graph paper so that the left end of the ruler is on the first blue line. You should see a line on your rulers

STRATEGY 2: cont'd

with the numeral 1 below it. The distance from one blue line to another is one inch. An inch is a unit of measure on the ruler. What is the distance from the second blue line to the third blue line?" (one inch) Repeat this procedure along the length of the graph paper.

Say, "What is the distance from the first blue line to the third blue line?" (two inches) Repeat this procedure along the length of the graph paper.

2.10.05.03 **measure objects less than a foot in length to the nearest inch and record using the symbol for inch (")**

STRATEGY 1: Prepare and distribute boxes containing popsicle sticks, an unsharpened pencil, a wood block, a length of string and a twelve inch ruler to groups of students. Ask the students to guess the length of each object in inches. Record these guesses on the chalkboard.

Demonstrate as you say, "Use the ruler to measure each object in your box. Remember to place the left edge of the ruler at the left edge of the object you are measuring. Look at the right end of the object. Read the number on the ruler that is closest to it. This is the length of the object to the nearest inch." Record the length of each object as it is measured. Say, "To show that we are measuring inches we write the symbol for inches next to the number which describes the length of the object." Demonstrate by writing the symbol, ", on the chalkboard. Ask the students to compare their measurements with their guesses.

2.10.05

STRATEGY 2: Prepare and distribute to each student a ruler with inch markings and five pre-measured strips of colored construction paper, e.g., a yellow strip about two inches long and a blue strip about five inches long. Ask several students to estimate the length of each strip. Record these estimates on the chalkboard.

Write the symbol for inch (") on the chalkboard. Point to it as you say, "This is the symbol for inch(es). Let's measure our yellow paper strip." Demonstrate by lining up the left end of the paper with the left end of the ruler. Say, "Between which two inches does the yellow strip end? (2" and 3") To which inch is it closer? (2) The two tells us how long the paper is to the nearest inch." Record the measurement on the chalkboard.

Repeat this procedure with the other paper strips.

2.10.05.04 **use the 12-inch ruler to measure a line segment**

STRATEGY 1: Distribute a 12-inch ruler to each student or group of students. Draw four line segments on the chalkboard. Ask four students to choose a segment, measure it, record its length in inches and write their names in the spaces provided.

e.g.,

Segment	Length	Name
______	1"	Patty
_____________	2"	Lenore
______________________	3"	Tom
______________	2"	Carmen

Ask each of these students to ask another student to repeat this procedure and compare their results.

Repeat this procedure with four new line segments.

2.10.05

2.10.05.05 **identify the relationships between inch and foot**

STRATEGY 1: Prepare and distribute twelve inch rulers and 12 one inch strips of paper to groups of four students. Say, "Measure one strip. How long is it? (one inch) Is it as long as the ruler? (no) How many strips placed end to end will be as long as the ruler? (12) How long is each strip? (one inch) How many inches equal one foot? (12) Twelve inches equal one foot." Write 12 inches = 1 foot on the chalkboard. Say, "Change strips with another group and measure their strips to check that 12 inches equal one foot."

2.10.05.06 **measure objects to the nearest foot and record, using the symbol for feet (')**

STRATEGY 1: Prepare and distribute rulers to each student. Ask a student to measure the length of one section of the chalkboard with the ruler. Say, "Can you measure the whole length of the chalkboard with your ruler? What can we do to measure using the rulers we have? (Move the ruler to fit the space.) How many times did you move the ruler across the chalkboard? What is the length of the chalkboard to the nearest foot?" Demonstrate the symbol for foot/feet by writing the symbol and the words on the chalkboard, e.g., ' means foot or feet. Record this measurement on the chalkboard using the symbol for foot/feet. (')

Repeat this procedure by measuring the height of a student's desk, the height of a teacher's desk, and the length and width of the classroom door.

STRATEGY 2: Divide the class into groups of four. Prepare and distribute yarn, scissors, and a yardstick to each group. Say, "Today we will measure the length of a student's arm, the measurement around a student's waist, and the length of a student's leg." Say, "Use the yarn to measure the arms, waists, and legs of the students in your group. Cut the yarn and record its length to the nearest foot on a sheet of paper." Ask the class to compare the results for each student with those of the other students. e.g.,

Measurements

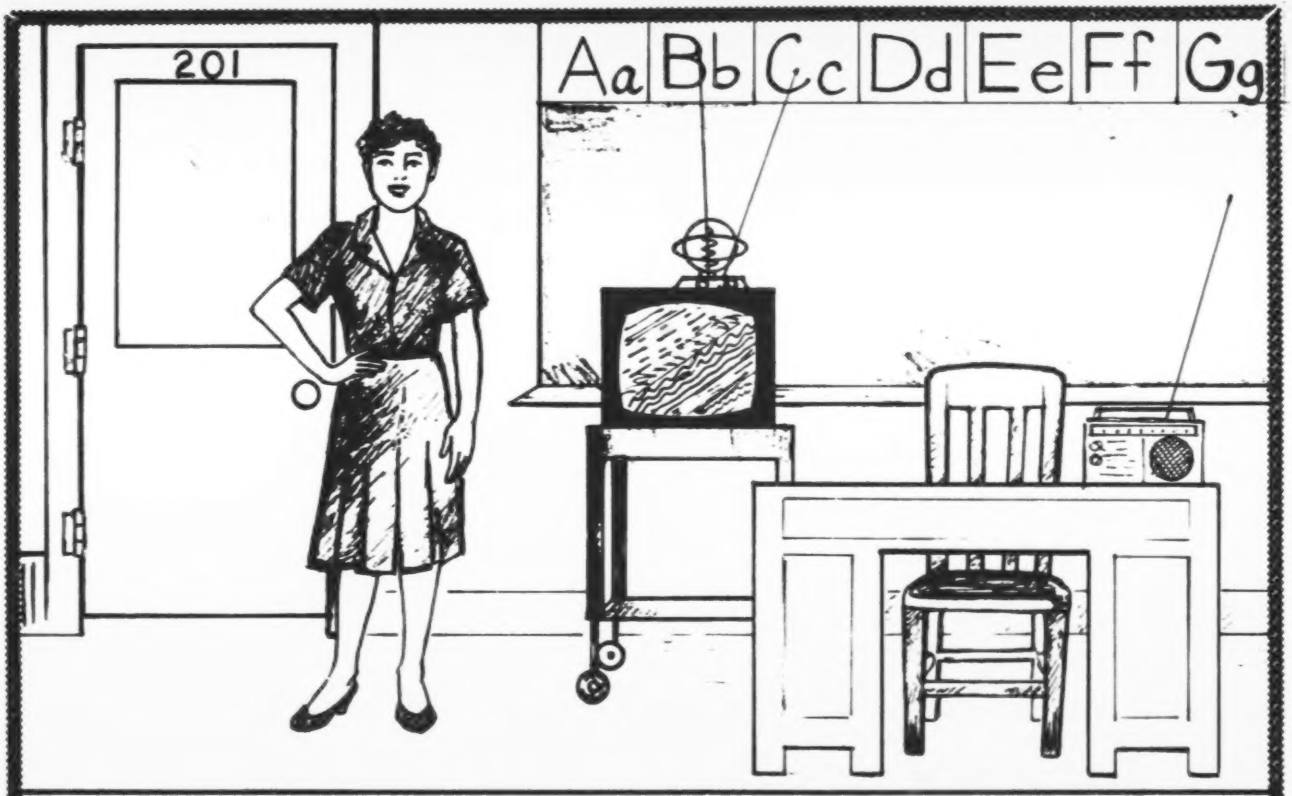
Name	Arm Length	Around the Waist	Leg Length
Kathleen	2'	1'	2'
________	________	________	________
________	________	________	________
________	________	________	________
________	________	________	________

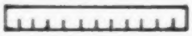
52

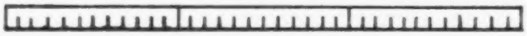
P.O. 2.10.05.01

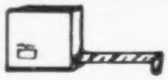
NAME:______________________________ CLASS:________ DATE:________

Write the name of the measuring tool which you would use to measure the length, width, or height of each object.


201
Aa Bb Cc Dd Ee Ff Gg


12 in. ruler


yardstick

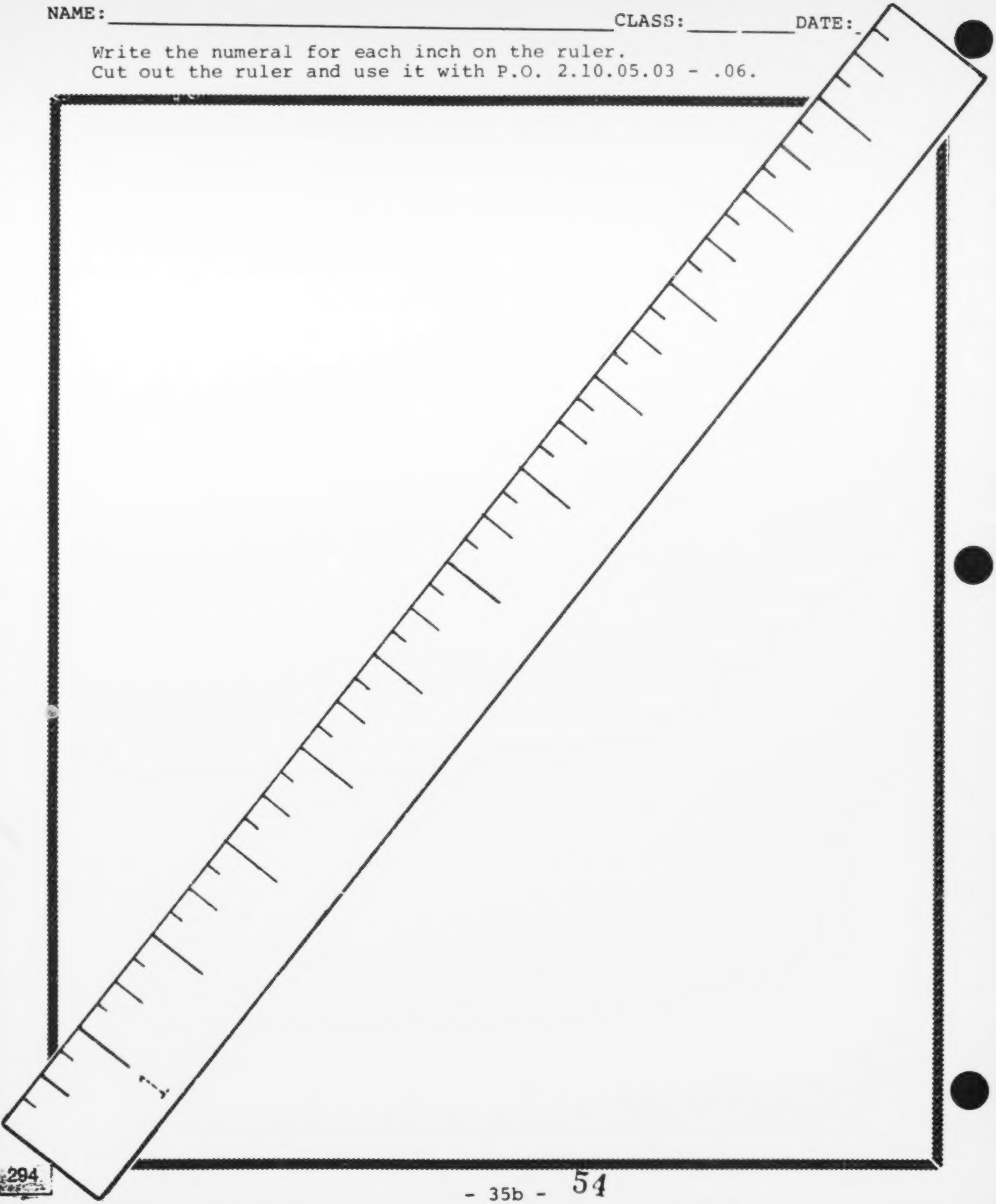

tape measure

Object	Tool
1. desk	________________
2. radio	________________
3. T.V.	________________
4. teacher	________________
5. T.V. table	________________
6. door	________________
7. chalkboard	________________

P.O. 2.10.05.02

NAME:____CLASS:_____ _____DATE:_

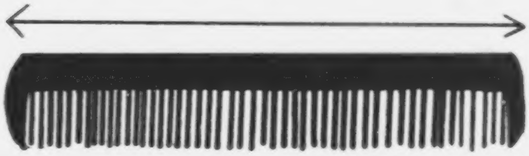
Write the numeral for each inch on the ruler.
Cut out the ruler and use it with P.O. 2.10.05.03 - .06.



P.O. 2.10.05.03

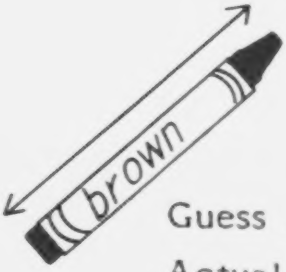
NAME: ______________________ CLASS: ________ DATE: ________

Guess the length of each item to the nearest inch. Use the ruler on page 35b to measure each item. Record your guess and the actual measurement.



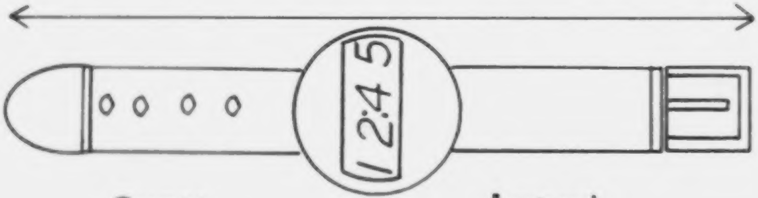
Guess ______

Actual ______

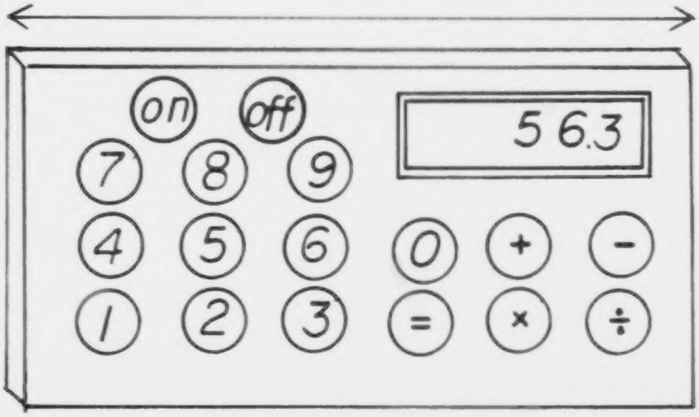


Guess ______

Actual ______



Guess ______ Actual ______


on
off
563
7
8
9
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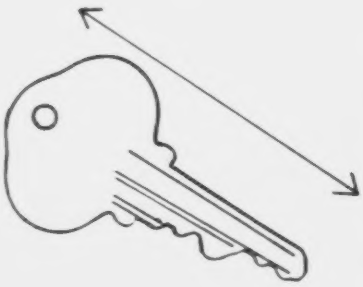
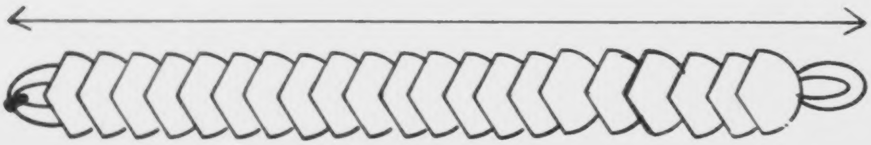
÷

Guess ______ Actual ______



Guess ______

Actual ______



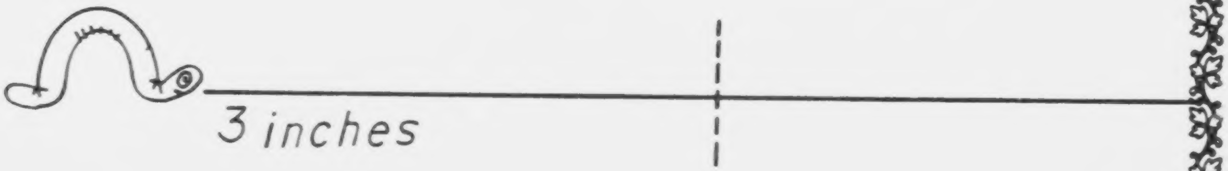
Guess ______

Actual ______

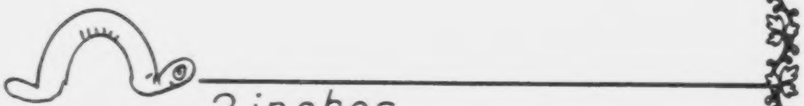
P.O. 2.10.05.04

NAME:______________________________ CLASS:________ DATE:________

Draw a line where the inchworm will stop.



3 inches



2 inches

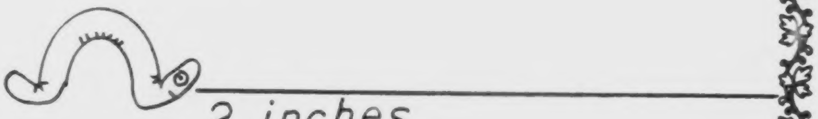
6 inches

4 inches

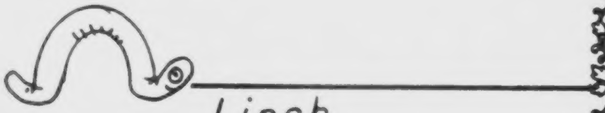
1 inch

5 inches

4 inches



2 inches

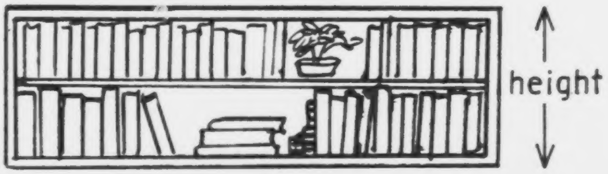
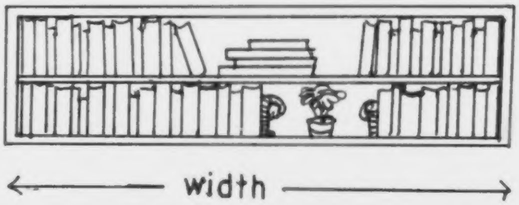
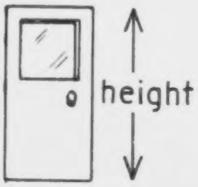
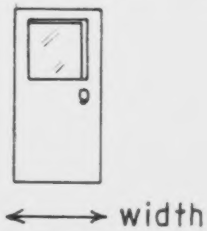
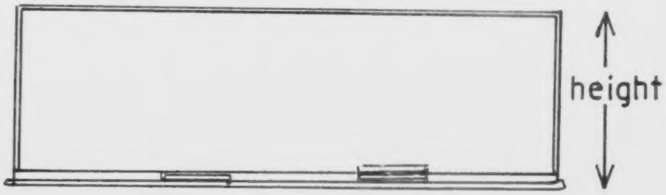
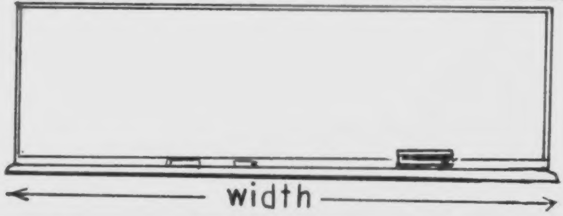


1 inch

P.O. 2.10.05.06

NAME:______________________________ CLASS:__________ DATE:________

Write your name and a classmate's name in the spaces shown. Guess the height or width of each item below in your classroom. Then use a ruler to measure the actual height or width. Whose guess was closer to the actual measurement each time?

	Guess		Actual Length
	name	name	
	3′	4′	5′
			
			
			
			
			

2.02.03 ADDITION OF 2- AND 3-DIGIT NUMBERS USING EXPANDED NOTATION WITHOUT REGROUPING (EXCHANGE)

(2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

2.02.03.01A add 2-digit numbers using expanded notation without regrouping (exchange);
e.g.,

$$\begin{array}{rcl} 22 & = & 20 + 2 \\ \underline{+\ 13} & = & \underline{10 + 3} \\ 35 & & 30 + 5 = 35 \end{array}$$

2.02.03.02A add 3-digit numbers using expanded notation without regrouping (exchange);
e.g.,

$$\begin{array}{rcl} 123 & = & 100 + 20 + 3 \\ \underline{+\ 415} & = & \underline{400 + 10 + 5} \\ 538 & & 500 + 30 + 8 = 538 \end{array}$$

2.02.03.03A add a 2-digit number and a 3-digit number using expanded notation without regrouping (exchange).
e.g.,

$$\begin{array}{rcl} 23 & = & 20 + 3 \\ \underline{+415} & = & \underline{400 + 10 + 5} \\ 438 & & 400 + 30 + 8 = 438 \end{array}$$

2.02.03

VOCABULARY

TERMS

expanded notation

GETTING STARTED

Prepare and distribute to each student a paper which has been folded into thirds. Say, "Listen to the numbers I say and write them on your paper. Write the hundreds numbers in the first column, the tens in the middle column and the ones in the last column." Demonstrate. Ask a student to write the numbers in expanded notation on the chalkboard.

Write the number 461 on the chalkboard. Say, "How many hundreds are in this number? (4) How do we write 4 hundreds?" (400) Ask a student to come to the chalkboard and write 400. Say, "How many tens are in this number? (6) How do we write 6 tens?" (60) Ask another student to write 60 on the chalkboard. Say, "How many ones are in this number?" (1) Ask a student to write 1 on the chalkboard. Write 461 = 400 + 60 + 1 on the chalkboard. Ask a student to read the number sentence. Repeat this procedure using other examples.

2.02.03

2.02.03.01 **add 2-digit numbers using expanded notation without regrouping (exchange)**

STRATEGY 1: Prepare and distribute place value mats, 9 blue chips and 9 yellow chips to each student or group of students. Say, "Each blue chip is a ten and each yellow chip is a one. Place 2 blue chips on your mat in the tens column. What number is shown?" (20) Write 20 on the chalkboard. Say, "Place 4 yellow chips on your mat in the ones column. What number is shown?" (4) Write 4 on the chalkboard next to the 20. Say, "What number is shown altogether?" (20 + 4 = 24)

Point to each number and operation symbol as you say, "Twenty plus four equals twenty-four."
e.g.,

H	T	O
	● ●	●●●●
	Blue	Yellow

20 + 4 = 24

Say, "Now place 3 blue chips on your mat. What number is shown?" (30) Demonstrate and write 30 under the 20. Say, "Place 5 yellow chips on your mat. What number is shown?" (5) Demonstrate and write 5. Say, "How much is 30 + 5?" (30 + 5 = 35) Complete the number sentence by writing = 35. Say, "Now should we add our two sets together?" Elicit that to add our two sets together, we add the ones column and the tens column to get the total amounts.
e.g.,

H	T	O
	●● ●●●	●●●● ●●●●●
	Blue	Yellow

$$\begin{array}{r} 20 + 4 = 24 \\ +\underline{30 + 5 = 35} \\ 50 + 9 = 59 \end{array}$$

2.02.03

STRATEGY 1: cont'd

Repeat this procedure with other pairs of 2-digit numbers.

STRATEGY 2:

Prepare and distribute place value mats and squared materials (tens and ones) to each student or group of students.

e.g.,

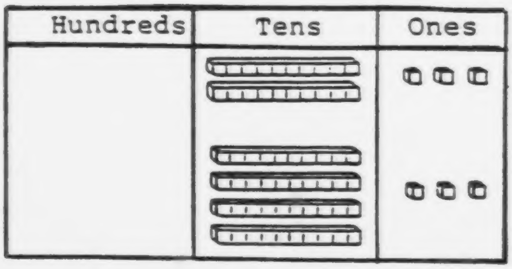
Hundreds	Tens	Ones

Note: At this grade level it is helpful to make place value mats on heavy oaktag and cover them with clear contact. These mats can then be used for place value, addition, and subtraction all year.

Write the following problem on the chalkboard as you read it aloud to the class: Tommy had 23 baseball cards. His father bought him 43 more. How many cards does Tommy have now? Elicit from the students why this is a problem using addition and that we have to add 23 plus 43. Say, "Show 23 using your tens and ones on your mat. (Students should show 2 tens and 3 ones on their place value mats.) How much are 2 tens? (20) How much are 3 ones?" (3) Ask a student to write 23 in expanded notation on the chalkboard, e.g., 23 = 20 + 3. Say, "Show 43 using your tens and ones." Ask another student to write 43 in expanded notation on the chalkboard.

2.02.03

STRATEGY 2: e.g.,
cont'd



$$\begin{array}{r} 20 + 3 = 23 \\ \underline{+40 + 3} = \underline{43} \end{array}$$

Say, "First, we add the numbers in the ones column on our mats. How much are 3 ones plus 3 ones? (6) Then we add our tens column. We have 2 tens plus 4 tens. How many tens are there in all? 6 tens and 6 ones are equal to what number? (66) Look at the problem on the chalkboard and add the problem in your notebook."

e.g.,

$$\begin{array}{r} 20 + 3 = 23 \\ \underline{+40 + 3} = \underline{43} \\ 60 + 6 = 66 \end{array}$$

Say and write on the chalkboard, "Tommy now has 66 baseball cards."

Repeat this procedure with a similar problem.

2.02.03.02 **add 3-digit numbers using expanded notation without regrouping (exchange)**

STRATEGY 1: Prepare and distribute place value mats and 9 each of three different color chips to groups of students. Say, "We are going to use different colored chips to show hundreds, tens, and ones. Red chips will show hundreds, blue chips will show

STRATEGY 1: cont'd

tens and yellow chips will show ones. How can we show two hundred forty-one?" Demonstrate. Say, "Place 2 red chips, 4 blue chips and 1 yellow chip on your mat to show two hundred forty-one." Point to each place as you write 200 + 40 + 1 on the chalkboard. Say, "What number is shown by the chips?" Write "= 241." Say, "Let's add one hundred twenty-three more. How many of each color do you need?" (1 red, 2 blue, 3 yellow) Write 100 + 20 + 3 under the first number. Say, "How much is shown by these chips?" Write "= 123." Say, "Let's add each place to see how much we have in all. When we add, we always begin with the ones place." Ask a student to add while you record the answer on the chalkboard.

e.g.,

H	T	O
●●	●●●●	●
●	●●	●●●
Red	Blue	Yellow

$$\begin{array}{r} 200 + 40 + 1 = 241 \\ + \underline{100 + 20 + 3} = \underline{123} \\ 300 + 60 + 4 = 364 \end{array}$$

Repeat this procedure with other 3-digit numbers.

STRATEGY 2: Prepare and distribute place value mats and squared material to each student or group of students. Write the following problem on the chalkboard as you read it aloud to the class: Tom and Betty were selling newspapers. On Monday they sold 315 newspapers and on Tuesday they sold 234. How many newspapers did they sell on both days? What operation do we use to solve this problem? (addition) Why? Use your squared material to show 315. What do you see in the hundreds place? (300)

STRATEGY 2: cont'd

...tens place? (10)...ones place?" (5) Write 300 + 10 + 5 = 315 on the chalkboard.

Repeat this procedure for 234 and write the expanded number on the chalkboard.
e.g.,

$$\begin{array}{r} 300 + 10 + 5 = 315 \\ \underline{+200 + 30 + 4} = \underline{234} \end{array}$$

Say, "First add the ones, then the tens, and then the hundreds." Ask a student to show the addition on the chalkboard. Reread the problem and ask a student to say how many newspapers Tom and Betty sold. (549) Write on the chalkboard: Tom and Betty sold 549 newspapers. Repeat this procedure with similar problems.

2.02.03.03 **add a 2-digit and a 3-digit number using expanded notation without regrouping (exchange)**

STRATEGY 1: Prepare and distribute to groups of students place value mats and 9 each of three different color chips. Say, "We will use different color chips to show hundreds, tens and ones. The red chips will be hundreds, the blue chips will be tens and the yellow chips will be ones. Use your chips to show 412." (4 red, 1 blue, 2 yellow) Demonstrate at the chalkboard as students work at their desks. Say, "What number does 4 red chips show? (400) 1 blue chip? (10) 2 yellow chips? (2) Use your chips to show 57. (5 blue, 7 yellow). What number does 5 blue chips show? (50) 7 yellow chips?" (7) Write the expanded notation on the chalkboard alongside the chips.

STRATEGY 1: cont'd

e.g.,

H	T	O
●●●●	●	●●
	●●●●●	●●●●●●●

$$\begin{array}{rcr} 400 + 10 + 2 & = & 412 \\ \underline{+ \qquad 50 + 7} & = & \underline{57} \end{array}$$

Ask a student to add each column and record the answer on the chalkboard.

e.g.,

$$\begin{array}{rcr} 400 + 10 + 2 & = & 412 \\ \underline{+ \qquad 50 + 7} & = & \underline{57} \\ 400 + 60 + 9 & = & 469 \end{array}$$

Repeat this procedure with other pairs of 2-and 3-digit numbers.

STRATEGY 2: Prepare and distribute place value mats and squared material to each student or group of students. (The place value mats were described in P.O. 2.02.03.01.) Write the following problem on the chalkboard as you read it aloud to the class. Say, "On Monday 233 students went to the park and on Tuesday 64 students went to the park. How many students went to the park on both days? What operation will we use to find the answer? (addition) Why? Use your squared material to show the numbers. How many students went to the park on Monday? (233) How many hundreds will we use? (2) ...tens? (3) ...ones? (3)" Demonstrate at the chalkboard as the students work at their seats. Write 200 + 30 + 3 = 233. Repeat this procedure for the students who went to the park on Tuesday. Ask a student to add each place, beginning with the ones, as you record the responses on the chalkboard.

e.g.,

$$\begin{array}{rcr} 200 + 30 + 3 & = & 233 \\ \underline{+ \qquad 60 + 4} & = & \underline{64} \\ 200 + 90 + 7 & = & 297 \end{array}$$

STRATEGY 2: cont'd

Say and write on the chalkboard, "On both days, 297 students went to the park."

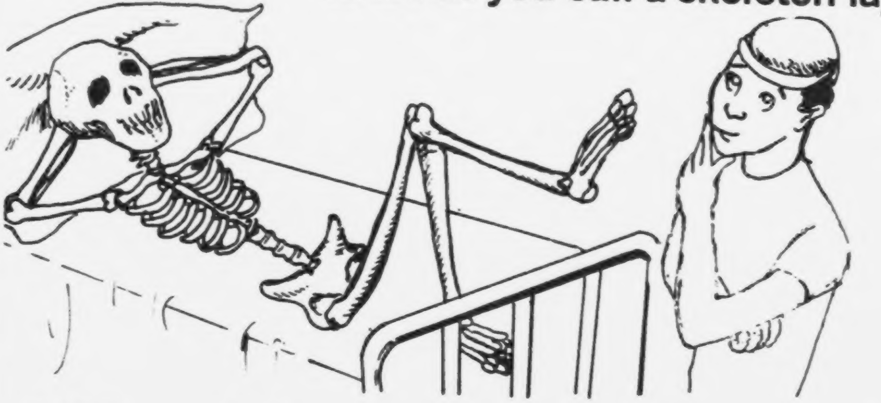
Repeat this procedure using other story problems with 2-and 3-digit numbers without regrouping.

P.O. 2.02.03.01

NAME: ______________________ CLASS: ________ DATE: ________

Add . Use the addition answers with the code to solve the riddle.

What do you call a skeleton laying in bed?



CODE

B	O	L	A	N	E	Z	Y
2	9	6	4	3	7	5	8

① $\begin{array}{r} 23 \\ +41 \\ \hline \end{array}$

20 + 3 = 23
+ 40 + 1 = +41
60 + 4 = 64

② $\begin{array}{r} 21 \\ +37 \\ \hline \end{array}$

___ + ___ =
___ + ___ =
___ + ___ = ___

③ $\begin{array}{r} 14 \\ +15 \\ \hline \end{array}$

___ + ___ =
___ + ___ =
___ + ___ = ___

④ $\begin{array}{r} 25 \\ +12 \\ \hline \end{array}$

___ + ___ =
___ + ___ =
___ + ___ = ___

ANSWER 6 4 (1) ___ ___ (2) ___ ___ (3) ___ ___ (4) S

P.O. 2.02.03.02

NAME: ______________________ CLASS: ________ DATE: ________

Use expanded notation to do the addition. Check your answer.

①

264
+232

200 + 60 + 4 = 264
+200 + 30 + 2 = +232
400 + 90 + 6 = 496

②

603
+ 341

____ + ____ + __ = ____
____ + ____ + __ = ____
____ + ____ + __ = ____

③

552
+ 140

____ + ____ + __ = ____
____ + ____ + __ = ____
____ + ____ + __ = ____

④ *There were 413 people at the circus on Monday and 375 people at the circus on Tuesday. How many people were there on both days?*

____ + ____ + __ = ____
____ + ____ + __ = ____
____ + ____ + __ = ____

P.O. 2.02.03.03

NAME: ____________________ CLASS: ________ DATE: ________

Add. Circle the answers which have numerals in counting order.

A.

$$\begin{array}{r} 412 \\ +44 \\ \hline \end{array}$$

400 + 10 + 2 = 412
+ 40 + 4 = + 44
400 + 50 + 6 = 456

B.

$$\begin{array}{r} 743 \\ +52 \\ \hline \end{array}$$

___ + ___ + ___ =
+ ___ + ___ = ___
___ + ___ + ___ = ___

C.

$$\begin{array}{r} 636 \\ +42 \\ \hline \end{array}$$

___ + ___ + ___ =
+ ___ + ___ = ___
___ + ___ + ___ = ___

D.

$$\begin{array}{r} 545 \\ +32 \\ \hline \end{array}$$

___ + ___ + ___ =
+ ___ + ___ = ___
___ + ___ + ___ = ___

E.

At Big Burger 672 chocolate shakes were sold and 17 vanilla shakes were sold. How many shakes were sold in all?

___ + ___ + ___ =
+ ___ + ___ = ___
___ + ___ + ___ = ___

2.03.03 SUBTRACTION OF 2- AND 3-DIGIT NUMBERS USING EXPANDED NOTATION WITHOUT REGROUPING (EXCHANGE)

(2-3 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

2.03.03.01A subtract 2-digit numbers using expanded notation without regrouping (exchange); e.g.,

$$\begin{array}{rcl} 78 & = & 70 + 8 \\ \underline{-36} & = & \underline{-(30 + 6)} \\ 42 & & 40 + 2 \;=\; 42 \end{array}$$

2.03.03.02B subtract a 2-digit number from a 3-digit number using expanded notation without regrouping (exchange); e.g.,

$$\begin{array}{rcl} 369 & = & 300 + 60 + 9 \\ \underline{-47} & = & \underline{-\qquad (40 + 7)} \\ 322 & & 300 + 20 + 2 \;=\; 322 \end{array}$$

2.03.03.03B subtract a 3-digit number from a 3-digit number using expanded notation without regrouping (exchange). e.g.,

$$\begin{array}{rcl} 584 & = & 500 + 80 + 4 \\ \underline{-273} & = & \underline{-(200 + 70 + 3)} \\ 311 & & 300 + 10 + 1 \;=\; 311 \end{array}$$

GETTING STARTED

Prepare and display squared material and a place value chart. Show 4 hundreds cards, 7 tens strips and 8 ones squares. Say, "How many hundreds are in this number?" (4) How may we write 4 hundreds? Ask a student to write 400 on the chalkboard. Repeat this procedure with the tens and the ones. Say, "I am going to place plus symbols between the numbers you have written." Point to each number as you say, "Four hundred plus seventy plus eight equals..." Write an equal symbol and ask a student to write 478 to the right of the equal symbol. Repeat this procedure using other three-digit numbers.

Prepare and display 6 tens and 5 ones on a place value chart. Say, "What number is shown by the squared material?" (65) Remove 2 tens and 3 ones. Say, "How much did I take away?" (23) Write $\begin{array}{r} 65 \\ \underline{-23} \end{array}$ on the chalkboard.

Say, "Remember that when you subtract, you always begin with the ones place. We had 5 ones and took away 3 ones. How many ones are left? (2) We had 6 tens and took away 2 tens. How many tens are left? (4) What is the answer? (42) Does the answer match the squared material that is left?" (Yes, there are 4 tens and 2 ones in the place value chart.)

2.03.03

2.03.03.01 subtract 2-digit numbers using expanded notation without regrouping (exchange)

STRATEGY 1: Prepare and distribute squared material and a place value mat to each student or group of students. Write 78 on the chalkboard. Say, "Use your squared material to show 78. How many tens are there? (7) What do 7 tens equal? (70) How many ones are there?" (8) Write 70 + 8 = 78 on the chalkboard. Say, "Let's subtract 36 from 78. How many ones should you remove? (6) ...tens?" (3)

Write

$$\begin{array}{rcr} 70 + 8 & = & 78 \\ \underline{-(30 + 6)} & = & -\underline{36} \end{array}$$

on the chalkboard.

Say, "When we subtract using expanded notation we must put parentheses around the numerals in the subtrahend, the number we are subtracting. This way we know that the minus symbol goes with both parts of the expanded numeral. Now we are ready to subtract. Let's start with the ones place." Ask a student to record the answer on the chalkboard as each step is verbalized. Complete the example.

$$\begin{array}{rcr} 70 + 8 & = & 78 \\ \underline{-(30 + 6)} & = & -\underline{36} \\ 40 + 2 & = & 42 \end{array}$$

Say, "Does 42 match the amount of squared material left on your chart?" (Yes, there are 4 tens and 2 ones.) Repeat this procedure using other pairs of 2-digit numbers.

Note: If it is appropriate at this time you may wish to challenge your students by asking them to incorporate expanded notation in the process of checking subtraction.

STRATEGY 2: Distribute 9 blue chips and 9 yellow chips to each student or group of students. Say, "You will use your chips to show different numbers. The blue

STRATEGY 2: cont'd

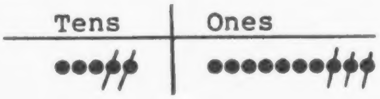
chips will be the tens and the yellow chips will be the ones. Display 5 blue and 9 yellow chips. What number have you shown? (59) Write 59 on your paper. 5 blue chips equal 5 tens. How much do 5 tens equal? (50) 9 yellow chips equal 9 ones. How much do 9 ones equal? (9) Now remove 2 blue chips and 3 yellow chips. How much do 2 blue chips and 3 yellow chips equal?" (23) Ask a student to show the example for 59 - 23 at the chalkboard. Write the example in expanded notation to demonstrate the way in which the chips were used.

e.g.,

$$\begin{array}{rcr} 50 + 9 & = & 59 \\ \underline{-(20 + 3)} & = & -\underline{23} \end{array}$$

Say, "We put parentheses around the subtrahend, the number we are subtracting. Now we know that the minus symbol goes with both parts of the expanded numeral. Ask a student to do the subtraction at the chalkboard while the other students follow along at their desks. Compare the answer with the chips to see if it is correct.

e.g.,



$$\begin{array}{rcr} 50 + 9 & = & 59 \\ \underline{-(20 + 3)} & = & -\underline{23} \\ 30 + 6 & = & 36 \end{array}$$

Repeat this procedure using other pairs of 2-digit numbers.

See **Note** after Strategy 1, P.O. 2.03.03.01

2.03.03.02 **subtract a 2-digit number from a 3-digit number using expanded notation without regrouping (exchange)**

STRATEGY 1: Prepare and distribute squared material and a place

STRATEGY 1: cont'd

value mat to each student or group of students. Write the number 369 on the chalkboard. Ask a student to identify the number. Say, "Use your squared material to show 369 on your place value mat. How many hundreds did you show? ...tens? ...ones? What is the value of three hundreds? (300) ...six tens? (60) ...nine ones?" (9) Write 300 + 60 + 9 = 369 on the chalkboard. Say, "You want to subtract 47 from 369. What symbol shows subtraction? (-) How many ones will you take away or subtract? (7) How many tens? ... (4) How many hundreds ...?" (none) Say, "What is the value of 7 ones?" (7) Write 7 beneath the 9. Say, "What is the value of 4 tens?" (40) Write 40 beneath 60. e.g.,

$$\begin{array}{rcr} 300 + 60 + 9 & = & 369 \\ \underline{-\quad (40 + 7)} & = & -\underline{\ 47} \end{array}$$

Ask a student to do the subtraction at the chalkboard. Say, "If you have 322 left, how many hundreds, tens, and ones should show on your place value mat?" (3 hundreds, 2 tens, 2 ones) Repeat this procedure subtracting other 2-digit numbers from 3-digit numbers.

See **Note** after Strategy 1, P.O. 2.03.03.01

STRATEGY 2:

Prepare and display a place value chart with three sets of different colored chips. Distribute a sheet of paper to each student. Demonstrate as you say, "Fold your paper into four columns. I will use the chips to show a number." Place 3 red chips for hundreds, 6 blue chips for tens and 9 yellow chips for ones on the place value chart. Say, "What number do these chips show?" Write 369 in the first column on the left and an equal symbol on the fold to the right of the number. Say, "How

STRATEGY 2: cont'd

many hundreds are shown by the red chips? (3) What is the value of 3 hundreds?" (300) Write 300 in the next column. Say, "How many tens are shown by the blue chips? (6) What is the value of 6 tens?" (60) Write 60 in the next column. Repeat this procedure for the ones. Write plus (+) symbols on the folds between 300, 60, and 9.

e.g.,

	Hundreds	Tens	Ones
369 =	300 +	60 +	9.

Say, "Three hundred sixty-nine = 300 + 60 + 9. Let's subtract 47 chips from the place value chart. Which colored chips should I remove?" (7 yellow and 4 blue) Remove the chips.

Write 300 + 60 + 9 = 369 on the chalkboard.
$\underline{-\quad(40 + 7)} = -\underline{\ 47}$

Say, "Now we are ready to subtract. Begin in the ones place and record your answer. Does your answer match the chips that are left?"

Repeat this procedure using other examples.

See **Note** after Strategy 1, P.O. 2.03.03.01.

2.03.03.03 subtract a 3-digit number from a 3-digit number using expanded notation without regrouping (exchange)

STRATEGY 1: Prepare and distribute squared material and a place value mat to each student or group of students. Write the number 584 on the chalkboard. Say, "We want to show 584 using squared materials. How many hundreds, tens, and ones do we need?" (5 hundreds,

STRATEGY 1:
cont'd

8 tens, 4 ones) When the students have displayed the material, say, "What is the value of 5 hundreds?" Write "=500" next to 584. Repeat this procedure for the tens and ones.

e.g.,

584 = 500 + 80 + 4

Say, "You will subtract or take away some of your squared material." Write "-273" beneath the 584. Say, "How many ones will you remove? (3) What is the value of 3 ones?" (3) Write 3 beneath the 4. Repeat this procedure for the tens and hundreds. Ask a student to do the subtraction at the chalkboard beginning with the ones place. Ask the students to compare the difference with the squared material that remains on the place value mat.

e.g.,

$$\begin{array}{rcl} 584 & = & 500 + 80 + 4 \\ \underline{-273} & = & \underline{-(200 + 70 + 3)} \\ 311 & = & 300 + 10 + 1 \end{array}$$

STRATEGY 2: Adapt Strategy 2 used in P.O. 2.03.03.02 for subtracting a 3-digit number from a 3-digit number.

P.O. 2.03.03.01

NAME: ______________________ CLASS: ________ DATE: ________

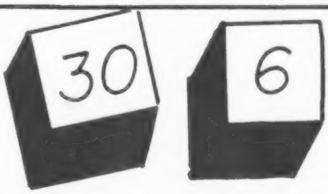
Follow the directions below.

Susan and Tony were rolling dice. They had to subtract 15 from their score each time. Help them find their scores for each roll.

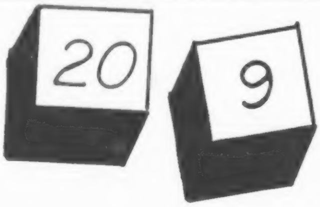
The winner is the one with the highest score. Circle the score of the winner of each game.

Susan's Scores | Tony's Scores

Game 1

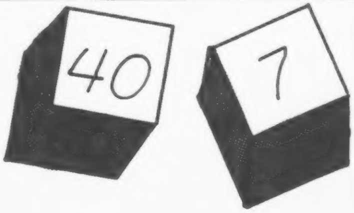


$$\begin{array}{r}36\\-15\\\hline 21\end{array} \qquad \begin{array}{r}30+6\\-(10+5)\\\hline 20+1=21\end{array}$$

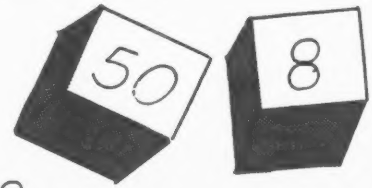


$$\begin{array}{r}29\\-15\\\hline\end{array}$$

Game 2

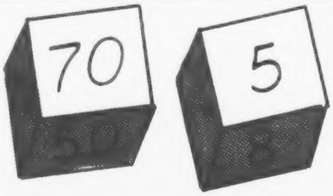


$$\begin{array}{r}47\\-15\\\hline\end{array}$$

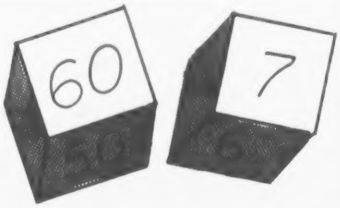


$$\begin{array}{r}58\\-15\\\hline\end{array}$$

Game 3



$$\begin{array}{r}75\\-15\\\hline\end{array}$$

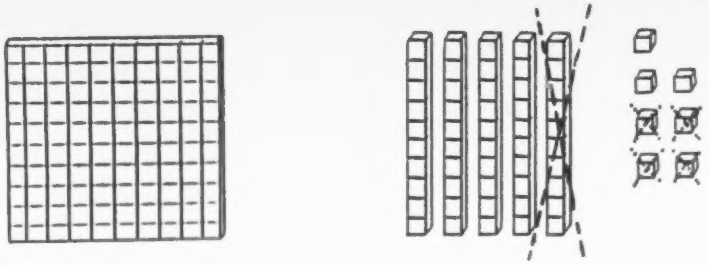


$$\begin{array}{r}67\\-15\\\hline\end{array}$$

P.O. 2.03.03.02

NAME: ______________________ CLASS: __________ DATE: __________

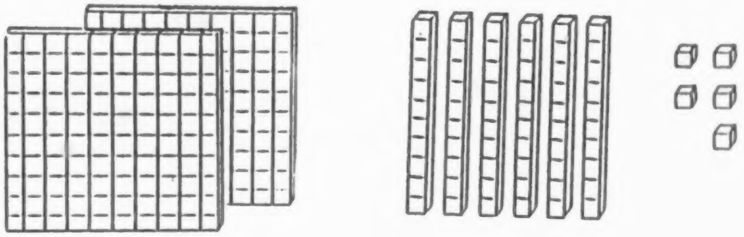
Cross out the amount of squared material to be taken away.
Complete the subtraction examples.



157 = 100 + 50 + 7

−14 = ___ (10 + 4)

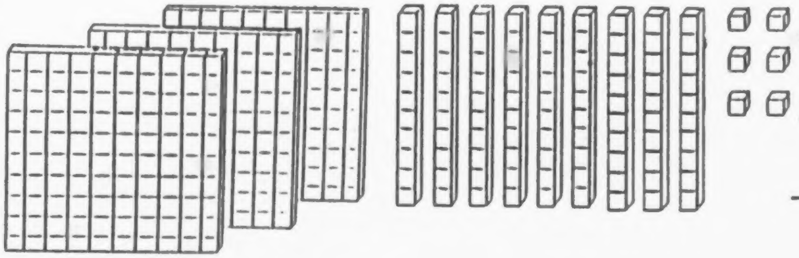
143 = 100 + 40 + 3



265 = ___ + ___ + ___

−23 = ___ ___ + ___

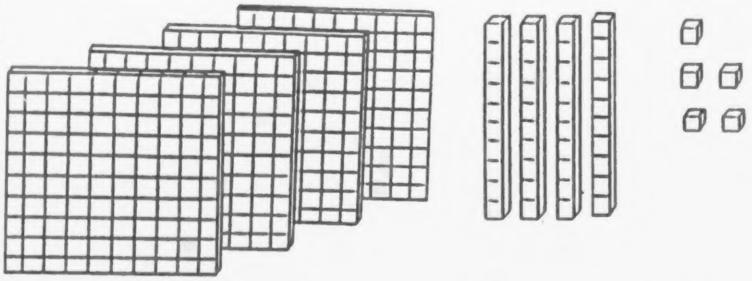
___ = ___ + ___ + ___



396 = ___ + ___ + ___

−83 = ___ ___ + ___

___ = ___ + ___ + ___



445 = ___ + ___ + ___

− 31 = ___ ___ + ___

___ = ___ + ___ + ___

P.O. 2.03.03.02

NAME: ____________________ CLASS: ________ DATE: ________

Expand each number and then do the subtraction.

①

187
- 52

100 + 80 + 7 = 187
- (60 + 2) = - 52
100 + 30 + 5 = 135

②

374
- 21

____ + ____ + ____ = ____
- ____ + ____ = - ____
____ + ____ + ____ = ____

③

298
- 76

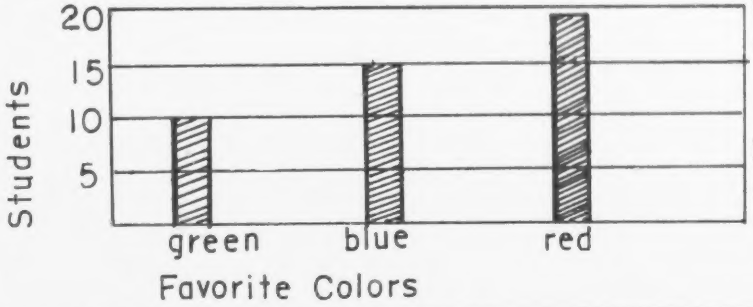
____ + ____ + ____ = ____
- ____ + ____ = - ____
____ + ____ + ____ = ____

④

463
- 12

____ + ____ + ____ = ____
- ____ + ____ = - ____
____ + ____ + ____ = ____

DO YOU REMEMBER?



Which is the favorite color? ____________

How many more students like blue than green? ____________

P.O. 2.03.03.03

NAME:______________________________ CLASS:________ DATE:________

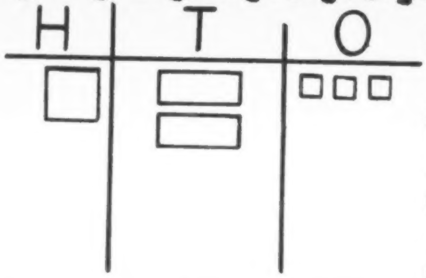
Write the expanded notation and do the subtraction. Match your answer to the place value chart showing that number.

①

654   600 + 50 + 4 = 654

- 422   −400 + 20 + 2 = −422

200 + 30 + 2 = 232

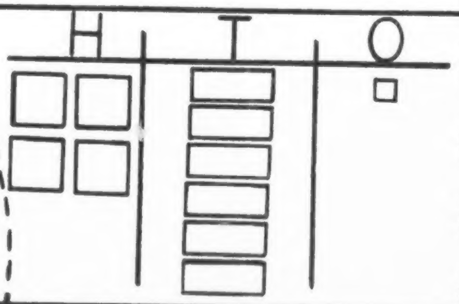


②

495   ____ + ____ + __ = ____

- 372   − ____ + ____ + __ = − ____

____ + ____ + __ = ____

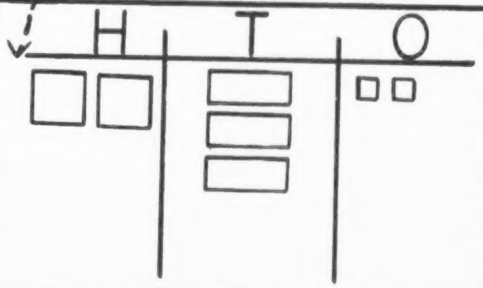


③

887   ____ + ____ + __ = ____

- 426   − ____ + ____ + __ = − ____

____ + ____ + __ = ____

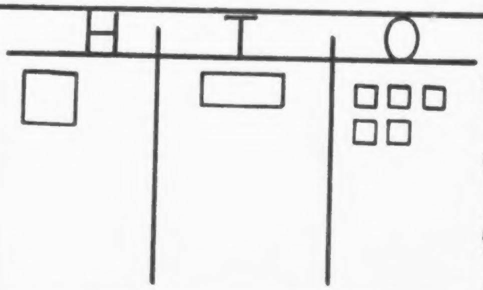


④

746   ____ + ____ + __ = ____

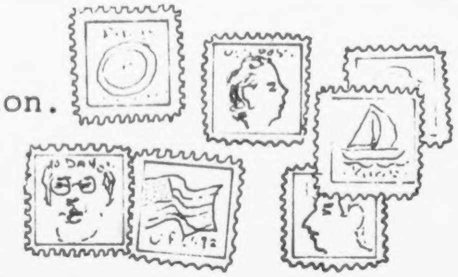
- 631   − ____ + ____ + __ = − ____

____ + ____ + __ = ____



DO YOU REMEMBER?

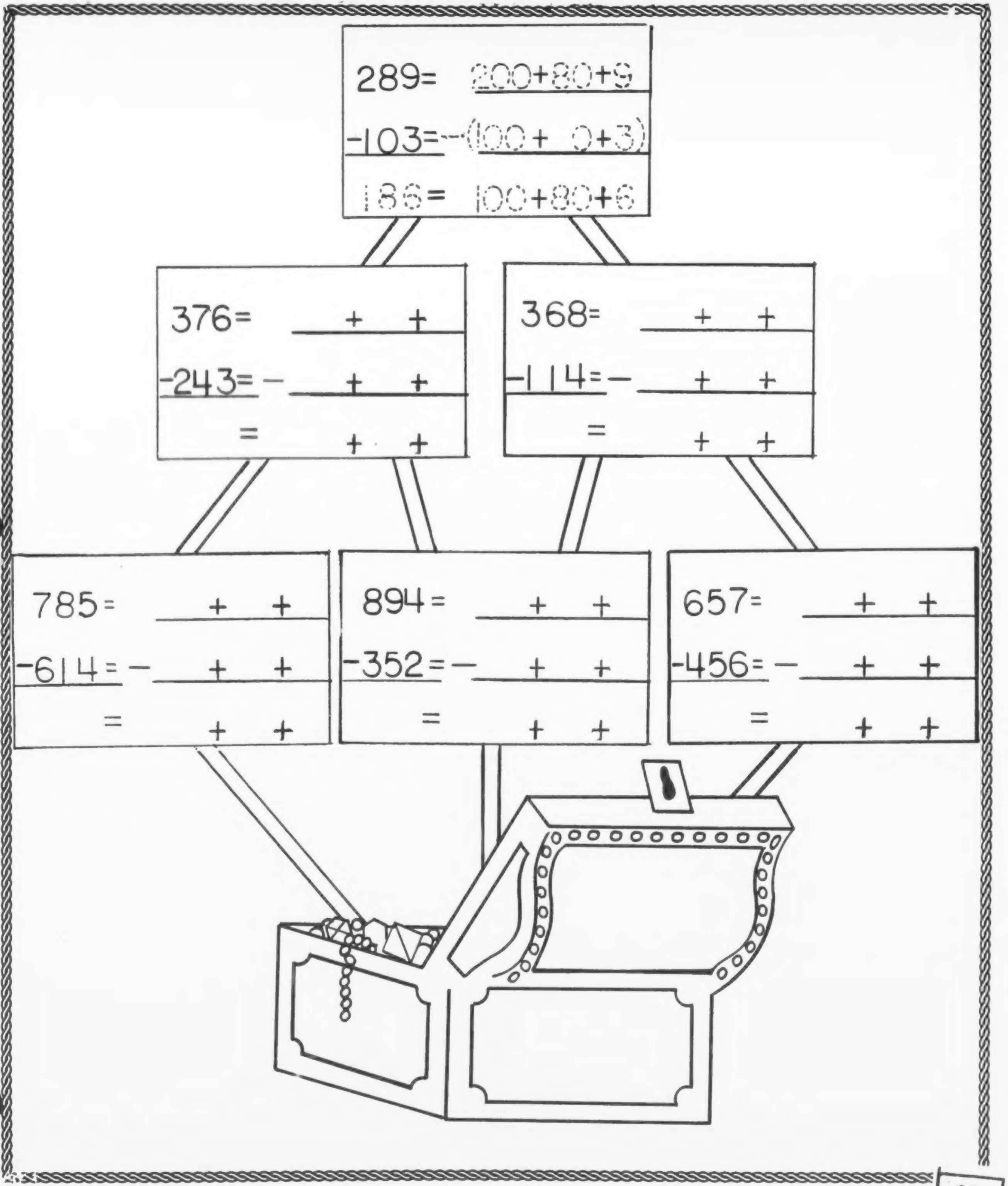
Tom collected 34 postage stamps.
He needs 75 to complete his collection.
How many more stamps does he need?



P.O. 2.03.03.03

NAME: ______________________ CLASS: __________ DATE: ________

Solve each example. Reach the treasure chest by drawing a line along the path which shows the answers getting larger.


289= 200+80+9
-103= -(100+ 0+3)
186= 100+80+6
376= + +
-243= - + +
= + +
368= + +
-114= - + +
= + +
785= + +
-614= - + +
= + +
894= + +
-352= - + +
= + +
657= + +
-456= - + +
= + +

2.02.04 ADDITION OF A 2-DIGIT NUMBER AND A 1-DIGIT NUMBER WITH REGROUPING (EXCHANGE) ONES TO TENS

(1-2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

2.02.04.01B add a 2-digit number and a 1-digit number with regrouping (exchange) using expanded notation;

e.g.,

$$\begin{array}{rcl} 13 & = & 10 + 3 \\ \underline{+\ 8} & = & \underline{+ \qquad\ \ 8} \\ & = & 10 + \overbrace{11} \\ & = & \underbrace{10 + 10} + 1 \\ & = & \underbrace{20 + 1} \\ & = & 21 \end{array}$$

2.02.04.02B add a 2-digit number and a 1-digit number with regrouping (exchange) ones to tens and check;

e.g.,

$$\begin{array}{r} {}^{1} \\ 23 \\ +\ 7 \\ \hline 30 \end{array} \qquad \begin{array}{r} \text{check} \\ {}^{1}7 \\ +23 \\ \hline 30 \end{array}$$

2.02.04.03B solve story problems related to skills learned in this module.

e.g.,

John had 14 comic books. Mary had 9 comic books. How many did they have in all?

$$\begin{array}{r} {}^{1} \\ 14 \\ +\ 9 \\ \hline 23 \end{array} \text{ comic books} \qquad \begin{array}{r} \text{check} \\ {}^{1}9 \\ +14 \\ \hline 23 \end{array}$$

2.02.04

VOCABULARY

TERMS

total
check
regrouping
exchange
expanded notation

GETTING STARTED

Prepare several sets of cards with a numeral from 0 through 9 on each. Play "Nine or Less." Ask two students to come to the front of the room. Give each student a card. Say, "I will keep giving you cards until you say stop. Then you will add the numbers on all your cards. Whoever has the sum closest to 9, without going higher, is the winner." Repeat this game using 3, 4, or 5 students at a time.

Prepare a set of 0 through 9 number cards. Distribute two cards to each student. Ask each student to stand and give the sum of his/her cards. Collect the cards, shuffle them, redistribute the cards and repeat this procedure.

2.02.04

2.02.04.01 **add a 2-digit number and a 1-digit number with regrouping (exchange) using expanded notation**

STRATEGY 1: Prepare and distribute squared material to each student or group of students. Say, "Use your squared material to show 43. How many tens did you use? (4) What is the value of 4 tens? (40) How many ones did you use? (3) What is the value of 3 ones?" (3) Write 40 + 3 = 43 on the chalkboard. Say, "Place eight more unit pieces on your desk." Record this at the chalkboard.

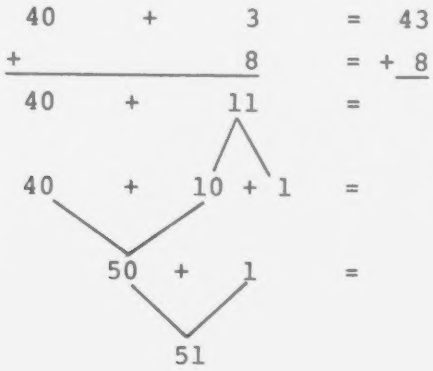
e.g.,

$$\begin{array}{rrrrr} 40 & + & 3 & = & 43 \\ \hline + & & 8 & = & +\ 8 \end{array}$$

Say, "How many ones do you have now? (11) Count 10 ones and exchange them for 1 ten. Put this ten with the other tens. How many ones are there now? (1)...tens? (5) What sum does this show?" (51)

Ask a student to record the procedure at the chalkboard.

e.g.,



Repeat this procedure with other combinations of squared material.

2.02.04

STRATEGY 2: Prepare play money (dimes and pennies). Draw two piggy banks on the chalkboard, one labeled dimes and the other labeled pennies. Say, "Mary has 35¢. How many dimes does she have? (3) How many pennies does she have?" (5) Ask a student to tape the correct amount of dimes and pennies inside the piggy banks. Say, "Mary's mother gave her 6¢ more which Mary placed in her penny bank." Ask a student to tape 6 more pennies inside the penny bank. Say, "How much money does Mary have in all?" (41¢) Ask a student to count the number of dimes and pennies. Say, "Mary has three dimes or thirty cents in the dime bank and eleven pennies or eleven cents in the penny bank. If Mary exchanges her pennies for dimes what will she have?" (1 dime and 1 penny) Ask a student to exchange 10 pennies for 1 dime and tape the dime inside the dime bank. Say, "Mary now has four dimes or forty cents. How many pennies does she have? (1) How much is forty cents plus one cent? (41¢) Let's write the story of Mary's money in a number sentence."

e.g.,

Mary had 35¢. Her mother gave her 6¢ more.
35¢ 30¢ + 5¢ = 35¢
+ 6¢ + 6¢ = + 6¢
30¢ + 11¢ =
30 + 10 + 1 =
40 + 1 =
41¢

NOTE: To reinforce problem solving, ask the students to use the examples on the worksheet to create verbal problems. Ask the students to tell why addition is needed to solve each problem.

2.02.04

2.02.04.02 **add a 2-digit number and a 1-digit number with regrouping (exchange) ones to tens and check**

STRATEGY 1: Prepare and display two bundles of ten sticks each and five single sticks.

Say, "How many sticks are there? (25) How many sticks would there be if you added 7 single sticks?" Add seven sticks to the five on display. Say, "How many single sticks are there in all? (12) How many sticks are needed to make a bundle? (10) Are there enough single sticks to make a bundle?" (yes) Ask a student to place a rubber band around ten sticks and add this bundle to the other bundles of ten. Say, "How many single sticks do we have now? (2) How many bundles of ten sticks...? (3) How many sticks do we have in all?" (32) Write $\begin{array}{r}25\\+\ 7\\\hline\end{array}$ on the chalkboard and say, "We can solve this example with numbers just as we did with sticks." Demonstrate the method for regrouping ones to tens by reviewing the steps at the chalkboard.

e.g.,

$$\begin{array}{r}\scriptstyle 1\\25\\+\ 7\\\hline 32\end{array}$$

Step 1: Add the ones column, 5 + 7.
Step 2: Regroup the ones,
12 ones = 1 ten + 2 ones.

Step 3: Add the tens column, 1 ten + 2 tens = 3 tens.

Say, "When we added the sticks, our answer was 32. When we solved the example, our answer was 32. To check, reverse the addends."

e.g.,

$$\begin{array}{r}\scriptstyle 1\\7\\+25\\\hline 32\end{array}$$

Repeat this procedure using other combinations of squared material.

2.02.04

STRATEGY 2: Prepare and display 18 blue chips and 9 red chips to represent ones and tens respectively, and a tens and ones place value chart. Say, "How can we show 17 on the place value chart? (we can use 1 red chip and 7 blue chips.) Ask a student to show 17 on the chart. Say, "How can we show 6 on our chart? (We can use 6 blue chips.) Ask a student to show 6 on the chart. Say, "How many chips are in the ones column?" (13) Ask a student to count each column of chips.

e.g.,

Tens	Ones
●	●●●●●●● ●●●●●●
Red	Blue

Say, "Can we exchange blue chips for red?" (Yes, 13 blue chips equal 1 red chip + 3 blue chips.) We had 13 blue chips. When we exchanged 10 blue chips for a red chip, we had only 3 blue chips left." Ask a student to exchange 10 blue chips for a red chip and place the red chip in the tens column with the other red chips. Say, "How many chips are now in the ones column? (3) ...tens column? (2) We added the new red chip to the red chip on the chart. Now we have 2 red chips." Elicit that 17 + 6 = 23.

e.g.,

Tens	Ones
●●	●●●
Red	Blue

Repeat this procedure with an example showing the

STRATEGY 2: cont'd

regrouping of ten ones for one ten.

e.g.,

$$\begin{array}{r} {}^{1} \\ 17 \\ +\ 6 \\ \hline 23 \end{array}$$

Ask the students to check the answer by reversing the addends. Say, "If the sums match, the answer is correct."

e.g.,

$$\begin{array}{rcr} & & \underline{\text{check}} \\ {}^{1} & & {}^{1}6 \\ 17 & & +17 \\ +\ 6 & & \\ \hline 23 & & 23 \end{array}$$

2.02.04.03 **solve story problems related to skills learned in this module**

STRATEGY 1: Prepare and display a box containing straws bundled in tens and ones and two hat bands, one labeled Tens and the other labeled Ones. Give two students the hat bands to wear. Say, "John has 27 rabbits and Max has 4 rabbits. How many rabbits do they have in all?" Ask a student to be John and say, "Select 27 straws to represent the rabbits. Now give two bundles of ten to the Tens person and the seven ones to the Ones person." Ask a student representing Max to select 4 rabbits (straws). Say, "Give your rabbits (straws) to the Ones person." Say to the Ones person, "How many rabbits (straws) do you have in your hand? (11) How can you regroup them?" (Put a rubber band around 10 ones and give the bundle to the Tens person. Keep

STRATEGY 1: cont'd

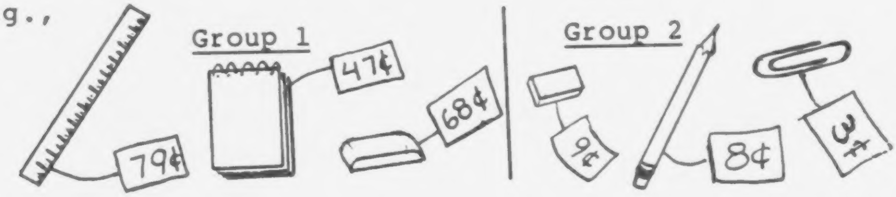
the 1 one.) Ask the ones student to demonstrate the regrouping. Say, "How many rabbits (straws) does the Tens person have now? (3 bundles of ten or 30) ...the Ones person? (1 one) How many do they have in all?" (John and Max together have 31 rabbits) Ask the students to show the numerical representation of the problem. Say, "How did you solve this problem? (I added.) Why did you add?"

Repeat this procedure with other problems.

Note: Students should be asked to check the solution against the problem conditions as well as checking their computation.

STRATEGY 2: Prepare and display two groups of classroom items with a price tag on each. Place 2-digit prices on the items in Group 1 and 1-digit prices on the items in Group 2.

e.g.,



Ask a student to select one item from Group 1 and one item from Group 2. Say, "How much money do you need to buy both of these items?" Ask the student to write, label, solve, and check the example on the chalkboard.

e.g.,

$$\begin{array}{rl} 79¢ & \text{(cost of ruler)} \\ +\ 3¢ & \text{(cost of paper clip)} \\ \hline 82¢ & \text{(total cost)} \end{array}$$

Say, " How did you solve this problem? (I added.) Why did you add?"

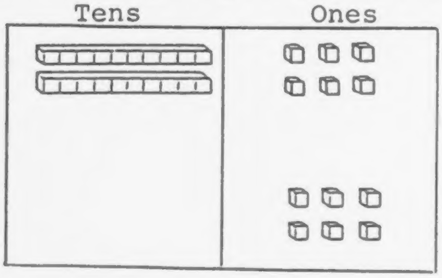
Repeat this procedure with other pairs of items.

See **Note** after Strategy 1.

P.O. 2.02.04.01

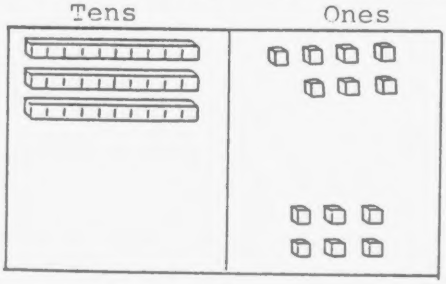
NAME: ______________________ CLASS: ________ DATE: ________

Add using expanded notation with regrouping.

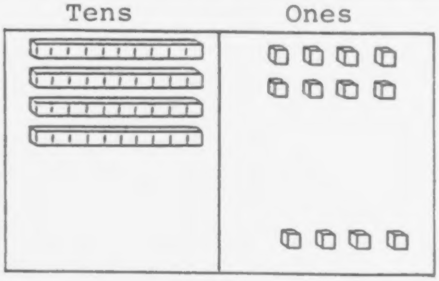


26 = 20+6
+ 6   + 6

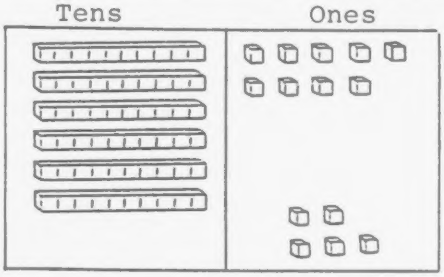
20+12 =
20+10+2 = 32



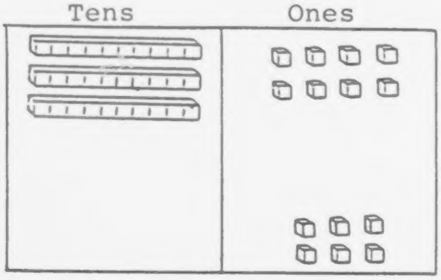
37 =
+ 6



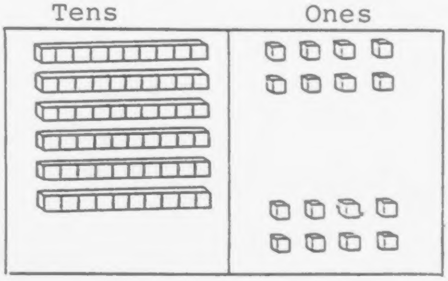
48 =
+ 4



69 =
+ 5



38 =
+ 6



68 =
+ 8

P.O. 2.02.04.02

NAME: ______________________ **CLASS:** __________ **DATE:** __________

Choose one item from each column. Write the name of each and its price. What is the total of each bill? Check your answers.

SCHOOL STORE PRICE LIST

Large Notebook	-85¢	Bookmark	- 7¢
Small Notebook	-64¢	Eraser	-8¢
Ruler	-58¢	Book Cover	-9¢
Pen	-47¢	Pencil	-6¢

Choose 1 item from each column.

	Check		Check
Large Notebook 85¢ Book Cover + 9¢ Total	9¢ +85¢	____________ ____________ ______	
____________ ____________ ______		____________ ____________ ______	

P.O. 2.02.04.03

NAME:________________ CLASS:________ DATE:________

Solve each problem. Check your work.

Little Bo Peep counted 22 sheep. Then she counted 9 more sheep. How many sheep did she count in all?	22 + 9	check 9 + 22
The King was in the counting house. He counted 49 gold coins. He counted 7 silver coins. How many coins did he count in all?		
Jack and Jill went up the hill. Jack filled 18 pails of water. Jill filled 9 pails of water. How many pails did they fill in all?		
Simple Simon met a pie man. He had 35 apple pies and 8 cherry pies. How many pies did he have in all?		
Hickory, dickory, dock! 19 mice ran up the clock. Then 4 more mice ran up the clock. How many mice ran up the clock in all?		

2.03.04 SUBTRACTION OF A 1-DIGIT NUMBER FROM A 2-DIGIT NUMBER WITH REGROUPING (EXCHANGE)

(2-3 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

2.03.04.01B subtract a 1-digit number from a 2-digit number with regrouping (exchange) using expanded notation;

e.g.,

$$\begin{array}{rcrcrl} 37 & = & 30 + 7 & = & 20 + 17 & \\ -\underline{\ 9} & = & -\underline{\qquad 9} & = & -\underline{\qquad\ \ 9} & \\ & & & & 20 + \ 8 & = 28 \end{array}$$

2.03.04.02B subtract a 1-digit number from a 2-digit number with regrouping (exchange) tens for ones and check;

e.g.,

$$\begin{array}{r} {}^{2\ 17} \\ \cancel{3}\cancel{7} \\ -\ 9 \\ \hline 28 \end{array} \qquad\qquad \begin{array}{r} \underline{\text{check}} \\ {}^{1}\ \ 9 \\ +28 \\ \hline 37 \end{array}$$

2.03.04.03B subtract money through 99¢ with regrouping (exchange) tens for ones and check;

e.g.,

$$\begin{array}{r} {}^{3\ 13} \\ \cancel{4}\cancel{3}¢ \\ -\ 9¢ \\ \hline 34¢ \end{array} \qquad\qquad \begin{array}{r} \underline{\text{check}} \\ {}^{1}\ \ 9¢ \\ +34¢ \\ \hline 43¢ \end{array}$$

2.03.04.04B solve story problems related to skills learned in this module.

e.g.,

Lorraine baked 62 cupcakes. Arthur ate 6 of the cupcakes. How many cupcakes did Lorraine have left?

check

$$\begin{array}{r} \overset{5}{\cancel{6}}\overset{12}{\cancel{2}} \\ -\ 6 \\ \hline 56 \end{array} \text{ cupcakes} \qquad \begin{array}{r} {}^{1}\ 6 \\ +56 \\ \hline 62 \end{array}$$

2.03.04

VOCABULARY

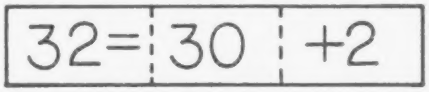
TERMS

regrouping
exchange
expanded notation
sum

GETTING STARTED

Prepare several flash cards showing expanded notation.

e.g.,

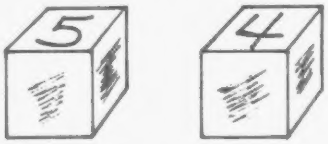


Fold the card to display only the number being discussed. (32) Say, "How many tens are in the number 32? What do three tens equal?" (30) Unfold the section showing 30. Say, "How many ones are in 32?" Unfold the section showing +2. After continued practice the students should be able to give the answer without referring to the flashcard.

Repeat this procedure using other numerals which have been written in expanded notation.

Distribute a pair of dice to groups of students. Say, "Each student will take a turn rolling the dice. After rolling the dice, write a two-digit number using the numbers which appeared on top of the dice. Next to this number write the number in its expanded form."

e.g.,



54 = 50 + 4

Repeat this procedure until everyone has rolled the dice at least once.

2.03.04

2.03.04.01 **subtract a 1-digit number from a 2-digit number with regrouping (exchange) using expanded notation**

STRATEGY 1: Prepare squared material (10 tens and 20 ones) for each student or group of students. Say, "Use your squared material to show the number 46. How many tens strips did you use? (4) How many ones...?" (6) Write 46 = 40 + 6 on the chalkboard. Say, "I want to take away 8 from 46." Write $\begin{array}{r} 46 \\ -\ 8 \\ \hline \end{array}$ on the chalkboard.

Say, "Look at the ones column. Can eight be taken away from six? (no) What can you do? (Exchange 1 ten strip for 10 ones). How many tens strips are left? (3) How many ones do you now have?" (16)

Write $\begin{array}{r} 46 \\ -\ 8 \\ \hline \end{array} = \begin{array}{r} 40 + 6 \\ -\qquad 8 \\ \hline \end{array} = \begin{array}{r} 30 + 16 \\ -\qquad 8 \\ \hline \end{array}$ on the chalkboard.

Say, "Now look at the ones column. Can 8 be taken away from sixteen? (yes) How much is left?" (8)

Write $\begin{array}{r} 30 + 16 \\ -\qquad 8 \\ \hline 30 + \ \ 8 \end{array} = 38$ on the chalkboard.

Repeat this procedure of subtraction with regrouping (exchange) using different numbers.

See **Note** after Strategy 1, P.O. 2.03.03.01.

STRATEGY 2: Prepare and display two containers, one labeled Tens and the other labeled Ones, and bundles of ten straws with some loose straws representing ones. Write 62 on the chalkboard. Ask a student to use the straws to show 62 and to tape them to the chalkboard. Say, "How many bundles of 10 are needed? (6) How many ones are needed?" (2) Write 62 = 60 + 2. Say, "Can we remove six straws from

STRATEGY 2:
cont'd

the ones? (no) What can be done?" (We can exchange one bundle of ten for ten ones.)

Write $\begin{array}{r} 62 \\ -\underline{\ 6} \end{array} = \begin{array}{r} 60 + 2 \\ -\underline{\qquad 6} \end{array} = \begin{array}{r} 50 + 12 \\ -\underline{\qquad 6} \end{array}$ on the chalkboard.

Say, "Fifty plus twelve is the same as sixty-two. Can we now remove 6 straws?" (yes) Remove the straws and say, "How many straws are left?"

Write $\begin{array}{r} 50 + 12 \\ -\underline{\qquad 6} \\ 50 + \ \ 6 \end{array} = 56$ on the chalkboard.

Repeat this procedure using different numbers.

See **Note** after Strategy 1, P.O. 2.03.03.01.

2.03.04.02 **subtract a 1-digit number from a 2-digit number with regrouping (exchange) tens for ones and check**

STRATEGY 1:

Prepare two containers labeled Tens and Ones and straws or sticks bundled in tens with some loose straws or sticks as ones. Distribute bundles of tens and ones to several groups of students. Ask a student to place four bundles of ten and three single sticks into the proper containers as the other students do this at their desks. Say, "How many straws are there?" (43) Write $\begin{array}{r} 43 \\ -\underline{\ 7} \end{array}$ on the chalkboard. Can you remove seven straws from the Ones container? (no) Why? (There are only 3 ones.) Where can you get more ones? (from the tens container) Let's untie a bundle from the Tens container and place them in the Ones container. How many bundles are left in the Tens container? (3) How many ones are now in the Ones container? (13) Can you now remove seven sticks from the Ones container? (yes) How many sticks remain?" (6) Write the example on the chalkboard.

2.03.04

STRATEGY 1: cont'd

e.g.,

$$\begin{array}{r} \overset{3\,13}{\cancel{4}\cancel{3}} \\ -7 \\ \hline 36 \end{array}$$

Say, "Is your answer correct? To check, add 36 plus the 7 you took away. If the answer (sum) is the same as the amount with which you started, you are correct."

e.g.,

Write the following on the chalkboard:

check

$$\begin{array}{r} \overset{1}{3}6 \\ +\ 7 \\ \hline 43 \end{array}$$

Repeat this procedure using other numbers.

STRATEGY 2: Prepare and distribute squared material (tens and ones) to each student or group of students. Write 34 on the chalkboard. Say, "Use your squared material to show 34 at your desk." Write $\begin{array}{r} 34 \\ -\ 6 \\ \hline \end{array}$ on the chalkboard. Say, "Can 6 ones be removed? (no) Why not? (There are only 4 ones.) What can you do? (You can exchange 1 ten for 10 ones.) Do this at your desk. How many tens are left? (2) How many ones do you have now? (14) Can we now remove 6 ones? (yes) How many ones are left? (8) Record the subtraction on the chalkboard showing the exchange.

e.g.,

$$\begin{array}{r} \overset{2}{\cancel{3}}\overset{14}{\cancel{4}} \\ -\ 6 \\ \hline 28 \end{array}$$

Do you have the correct answer? Let's add the answer (28) plus the part you took away (6) to check. What is the total? (34) Is the total the

STRATEGY 2: cont'd

same as the number with which you started? (yes) If it is, you are correct."

Repeat this procedure using other numbers.

e.g.,

Write the following on the chalkboard:

$$\begin{array}{r} \underline{\text{check}} \\ 28 \\ \underline{+\ 6} \\ 34 \end{array}$$

2.03.04.03 subtract money through 99¢ with regrouping (exchange) tens for ones and check

STRATEGY 1:

Prepare and distribute play money (dimes and pennies) to each student or group of students. Write the following on the chalkboard:

$$\begin{array}{lr} \text{2 dimes + 4 pennies} & 24¢ \\ \underline{-\qquad\qquad\text{8 pennies}} & \underline{-\ 8¢} \end{array}$$

Say, "Display 2 dimes and 4 pennies on your desk. Take 8 pennies away from the amount you have. How can you do this? (Exchange 1 dime for 10 pennies.) How many dimes do you now have left? (2) How many pennies do you have now?" (14)
Write the following example on the chalkboard:

$$\begin{array}{lr} \overset{1}{\cancel{2}}\text{ dimes + 14 pennies} & \overset{1}{\cancel{2}}\overset{14}{\cancel{4}}¢ \\ \underline{-\qquad\qquad\text{8 pennies}} & -\ \underline{8}¢ \\ \text{1 dime + 6 pennies} & 16¢ \end{array}$$

Say, "How much money is left? (16¢) How can you check your answer?" Elicit that if 16¢ is added to the number of pennies you took away, and your answer is the same as the amount with which you started, you know your answer is correct.

2.03.04

STRATEGY 1: cont'd

e.g.,

Write the following on the chalkboard:

$$\begin{array}{r} \underline{\text{check}} \\ \overset{,}{1}6\text{¢} \\ \underline{+\ 8\text{¢}} \\ 24\text{¢} \end{array}$$

Repeat this procedure using other examples.

STRATEGY 2: Prepare and display play coins and cards showing school items priced less than ten cents. Say, "Mother gave you fifty-one cents to buy school supplies." Choose a card. What will you buy? (a pencil for six cents) How much money will you have left? How can you solve this problem? (I can subtract.) How do you know?" Write $\begin{array}{r} 51\text{¢} \\ \underline{-\ 6\text{¢}} \end{array}$ on the chalkboard. Say, "What must you do to subtract six cents from fifty-one cents?" (Exchange one dime for ten pennies.)

Elicit the following steps from the students as you write on the chalkboard:

$$\begin{array}{rcrcrcr} 51\text{¢} & = & 50\text{¢} + 1\text{¢} & = & 40\text{¢} + 11\text{¢} & \text{or} & \overset{4}{\cancel{5}}\overset{11}{\cancel{1}}\text{¢} \\ -\underline{\ 6}\text{¢} & = & -\underline{\qquad\quad 6}\text{¢} & = & -\underline{\qquad\quad 6}\text{¢} & & -\underline{\ 6}\text{¢} \\ & & & & 40\text{¢} + \ 5\text{¢} & & 45\text{¢} \end{array}$$

Say, "How can you check your subtraction? (We can add what is left to the amount we spent. If the answer is the same amount as that with which we started, then the answer is correct.)

e.g.,

Write the following on the chalkboard:

$$\begin{array}{r} \underline{\text{check}} \\ \overset{,}{4}5\text{¢} \\ \underline{+\ 6\text{¢}} \\ 51\text{¢} \end{array}$$

Repeat this procedure using the other cards.

2.03.04.04 **solve story problems related to skills learned in this module**

STRATEGY 1: Write on the chalkboard and say, "John has a new dog that he wants to train. He will read a book to learn about training. The book has 45 pages. He has read 8 pages so far. How many pages does he have left to read? How will you find out how many pages John still has to read? (subtract) What key word or clue word usually means subtraction?" (left) Write $\begin{array}{r}45\\ -\ 8\\ \hline\end{array}$ on the chalkboard. Ask a student to do the subtraction. Elicit and write the following on the chalkboard: $\begin{array}{r}\overset{3}{\cancel{4}}\overset{15}{\cancel{5}}\\ -\ 8\\ \hline 37\end{array}$ pages

Say, "How many pages does John have left to read? (John has 37 pages left to read.) Check your answer."

Repeat this procedure using other examples.

STRATEGY 2: Write a word problem on the chalkboard.
e.g.,

Maria had 53¢.
She gave her sister 8¢.
How much money does Maria still have?

Say, "What do we want to find out? (how much money Maria still has) How can we do this? (We will subtract.) How do you know? With how much money did Maria begin? (53¢) How much money did she give to her sister?" (8¢) Write $\begin{array}{r}53¢\\ -\ 8¢\\ \hline\end{array}$ on the chalkboard.

Say, "How much money does Maria have now?" Ask a student to complete the computation at the chalkboard, indicating the exchange of one ten for

STRATEGY 2: cont'd

ten ones.

e.g.,

$$\begin{array}{r} {}^{4}\,{}^{13} \\ \cancel{5}3 \\ -\ \ 8 \\ \hline 45 \end{array}$$

Ask a student how we can check the answer.

e.g.,

$$\begin{array}{r} {}^{1} \\ 45 \\ +\ \ 8 \\ \hline 53 \end{array}$$

Repeat this procedure using other story problems.

P.O. 2.03.04.01

NAME: ______________________ CLASS: ________ DATE: ________

Solve each example. Find and circle your answer in the bingo box. How many examples must you complete before you get bingo?

44	19	9	84
8	15	25	28
37	88	67	3
59	58	33	77

① 51= 50+1= 40+11
−7= − 7= − 7
40+4=44

⑦ 67= 60+7= ___+___
−9= − 9= − 9

② 17= 10+7= ___+___
−8= − 8= − 8

⑧ 73= 70+3= ___+___
−6= − 6= − 6

③ 23= 20+3= ___+___
−4= − 4= − 4

⑨ 43= 40+3= ___+___
−9= − 9= − 9

④ 24= 20+4= ___+___
−9= − 9= − 9

⑩ 32= 30+2= ___+___
−9= − 9= − 9

⑤ 33= 30+3= ___+___
−8= − 8= − 8

⑪ 66= 60+6= ___+___
−7= − 7= − 7

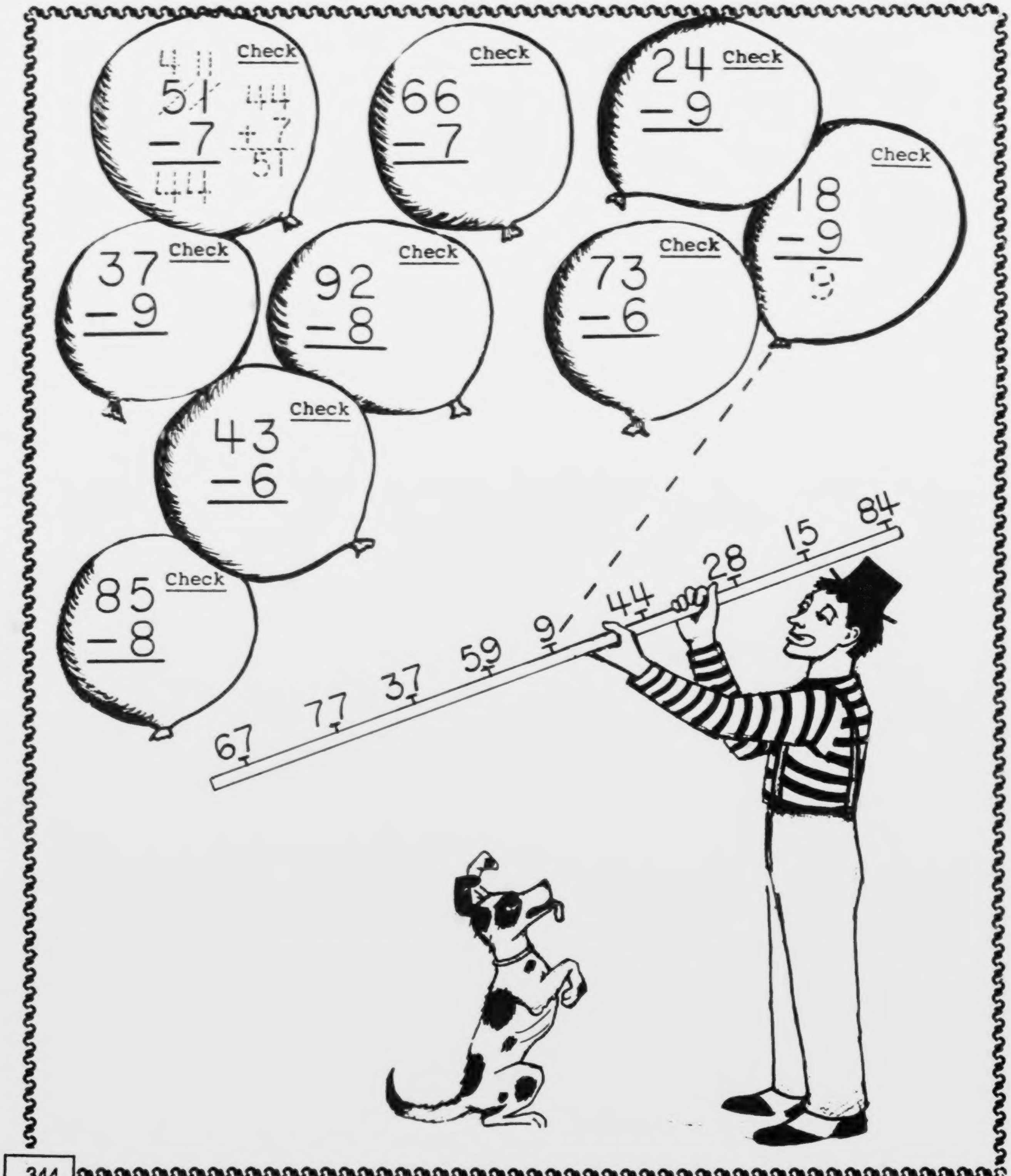
⑥ 96= 90+6= ___+___
−8= − 8= − 8

⑫ 85= 80+5= ___+___
−8= − 8= − 8

P.O. 2.03.04.02

NAME: ______________________ CLASS: __________ DATE: ________

Subtract each example. Draw a string from each balloon to its answer on the balloon holder.


4 11
51
−7
44
Check
44
+7
51
Check
66
−7
24
−9
Check
Check
18
−9
9
37
−9
Check
92
−8
Check
73
−6
Check
43
−6
Check
85
−8
67
77
37
59
9
44
28
15
84

P.O. 2.03.04.03

NAME: ____________________ CLASS: ________ DATE: _______

Each student spent some money. How much money does each student have left?

Bill had 24¢.

He spent 7¢.

24¢
-7¢

Bill has 17¢ left.

Anna had 35¢.

She spent 6¢.

Anna has ______ left.

Sue had 18¢.

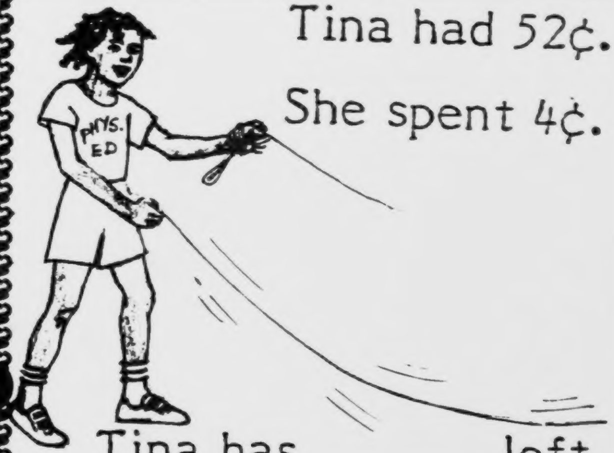
She spent 9¢.

Sue has ______ left.

Juan had 81¢.

He spent 2¢.

Juan has ______ left.



Tina had 52¢.

She spent 4¢.

Tina has ______ left.

Tony had 73¢.

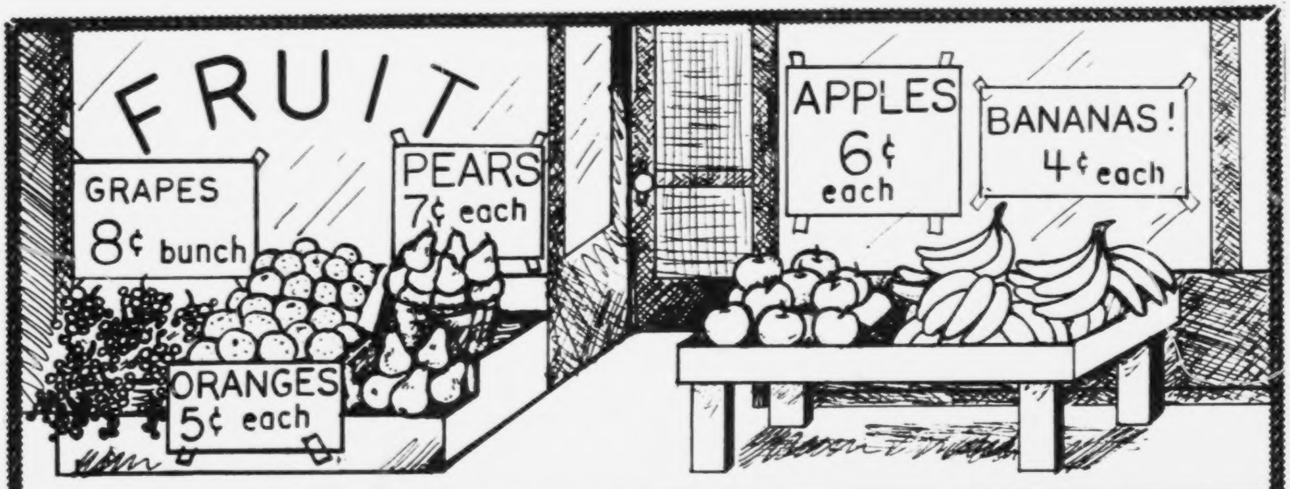
He spent 5¢.

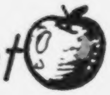
Tony has ______ left.

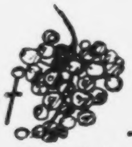
P.O. 2.03.04.04 .

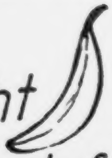
NAME: ______________________ CLASS: ________ DATE: ________

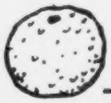
Subtract. Show the regrouping. Check your answer.

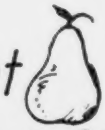

FRUIT
GRAPES
8¢ bunch
PEARS
7¢ each
ORANGES
5¢ each
APPLES
6¢
each
BANANAS!
4¢ each

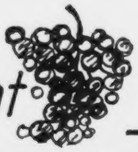
Had 1 12 ~~22~~¢ CHECK
Bought  − 6¢
Money left 16¢

Had 37¢ CHECK
Bought  ____¢
Money left ¢

Had 51¢ CHECK
Bought  ____¢
Money left ¢

Had 63¢ CHECK
Bought  ____¢
Money left ¢

Had 73¢ CHECK
Bought  ____¢
Money left ¢

Had 47¢ CHECK
Bought  ____¢
Money left ¢

DO YOU REMEMBER?

526 = 500 + 20 + 6

343 = ____ + 40 + 3

287 = 200 + ____ + 7

103 = 100 + ____ + 3

888 = ____ + 80 + ____

950 = ____ + ____ + ____

2.10.06 MONEY - MAKE CHANGE THROUGH THE VALUE OF A DOLLAR

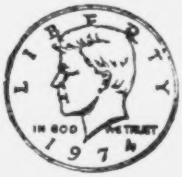
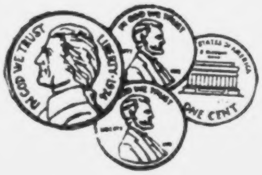
(1-2 lessons)

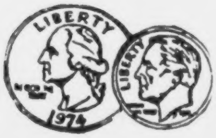
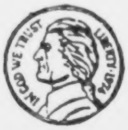
PERFORMANCE OBJECTIVES

The student will be able to...

2.10.06.01B make change through the value of fifty cents;

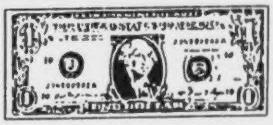
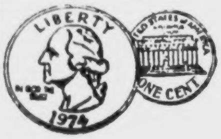
e.g.,

GIVEN	PRICE	CHANGE
	42¢	

GIVEN	PRICE	CHANGE
	30¢	

2.10.06.02B use combinations of coins to make change through the value of one dollar.

e.g.,

cost of item	paid with	change
74¢		

2.10.06

VOCABULARY

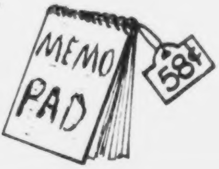
TERMS

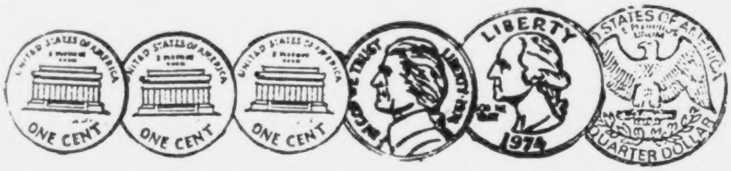
change
cost
half-dollar
quarter

GETTING STARTED

Prepare and distribute toy money to each student. Label several classroom items, e.g., ruler 10¢, eraser 15¢, pencil 5¢, memo pad 58¢. Display one item at a time and ask the students to choose the coins necessary to buy each item.

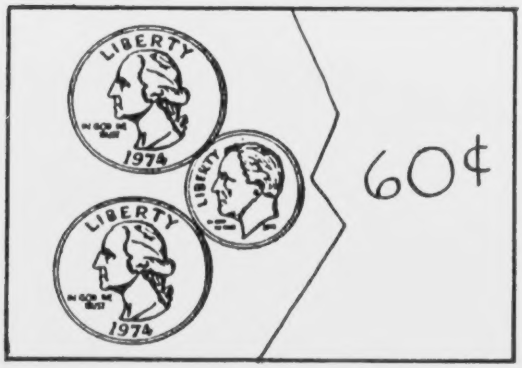
e.g.,

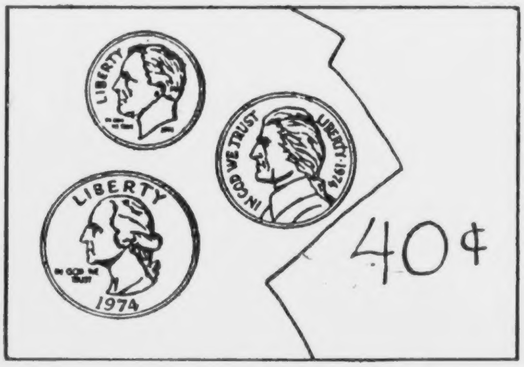



ONE CENT
ONE CENT
ONE CENT
LIBERTY
1974
QUARTER DOLLAR

Construct a set of money puzzle cards. Ask the students to complete the puzzles. Store the puzzle pieces in a shoebox.

e.g.,


LIBERTY
1974
LIBERTY
LIBERTY
1974
60¢


LIBERTY
LIBERTY
1974
40¢

2.10.06

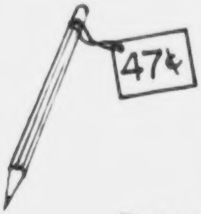
2.10.06.01 make change through the value of fifty cents

STRATEGY 1: Prepare toy half-dollars and several tagged items, priced less than 50¢, for sale. Say, "Words have different meanings, e.g., light can mean brightness from the sun or it can mean not heavy. The word 'change' can have different meanings, too." Ask a student to change his/her seat. Say, "What is another meaning for the word 'change'?" (Change is the money you get back if you give the clerk more money than your purchase costs. Change can also refer to the coins themselves.)

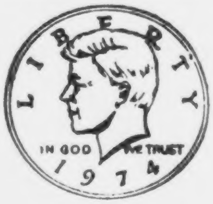
Display the items for sale. Distribute the half-dollar toy coins. Say, "Each student may purchase an item with this coin. What is the value of the coin? (50¢) Select an item. If you give me the half-dollar, how much change will you get if the item costs forty-seven cents? To find out, count up, beginning with forty-eight and ending at fifty."

e.g.,

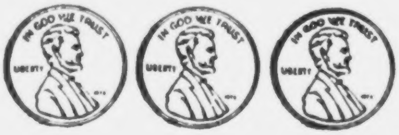
You bought a pencil for 47¢.



You gave the clerk a half-dollar.



Your change is 3¢.

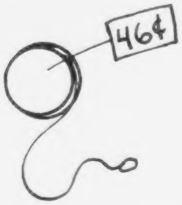


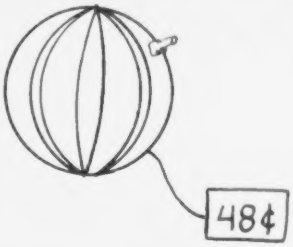
Repeat this procedure with other items always counting up to the value of the half-dollar (50¢). **Note:** Students may be challenged by having the change include pennies, nickels, and dimes. This would necessitate having students count by ones, then fives, and then tens.

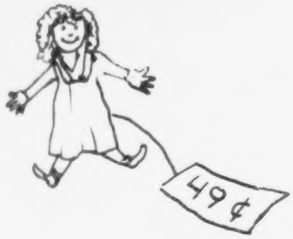
2.10.06.

STRATEGY 2: Prepare and display a flannelboard with coin cutouts (nickels, dimes, quarters, and half-dollars), a "cash register" with change and several items for sale (less than 50¢).

e.g.,







Say, "You will take turns as clerk at the cash register." Ask a student to come to the "store". Say, "Here is fifty cents to spend on a gift. (Begin with a half-dollar, then use two quarters, 5 dimes,...) Which gift will you buy? Count the amount of change by counting up from the cost of the item you selected to the amount you gave to the clerk."

e.g.,

You gave the clerk 2 quarters or 50¢.
The crayons cost 46¢.
Your change is 4¢.

Repeat this procedure with other students using other combinations of coins to purchase different items.

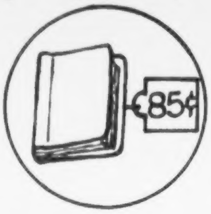
2.10.06.02 **use combinations of coins to make change through the value of one dollar**

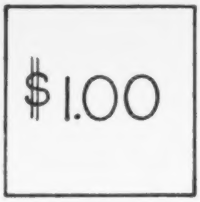
STRATEGY 1: Distribute play money to groups of students. Display pictures of various items for sale. Draw a rectangle and a circle on the chalkboard. Say, "I

Strategy 1: cont'd

will tape the item I will buy inside the circle. I will tape my money inside the rectangle.

e.g.,

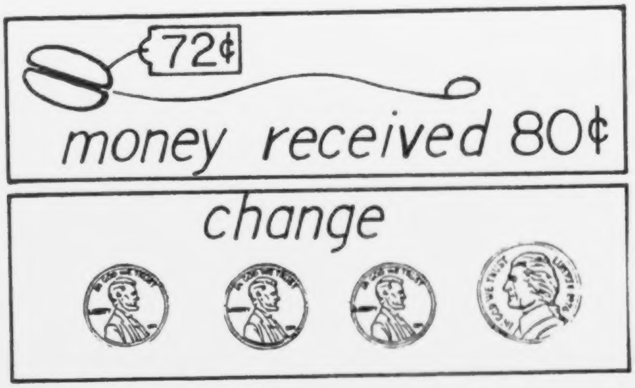




Each group will count up the change I will receive. How will you give change?" Ask several students to demonstrate giving the correct amount of change. Say, "What are the greatest number of coins I may use to give change? (15 pennies) ... the fewest number of coins?" (two coins; one dime and one nickel) Repeat this procedure with other items. **Note:** The counting up should be limited to counting from an amount which is near the cost, e.g., counting up from 57¢ to 60¢ or counting up from 64¢ to 75¢.

STRATEGY 2: Prepare and display money cards and pictures of various items for sale, showing the cost of the item and the money received for each.

e.g.,



Say, "This is a story about a clerk in a store. Here are pictures of items for sale. Each card also shows the amount of money the clerk received when the item was bought. I have also placed money cards along the chalkboard ledge with the correct

2.10.06
STRATEGY 2: cont'd

change for each of the purchases. Can you match each change card to its picture card?"

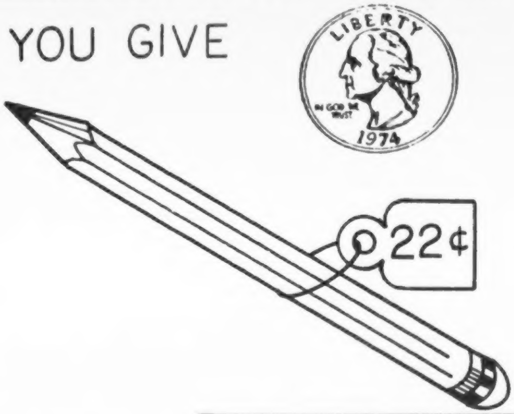
Repeat this procedure with other items for sale and other coin (change) cards.

P.O. 2.10.06.01

NAME: ______________________ CLASS: __________ DATE: ________

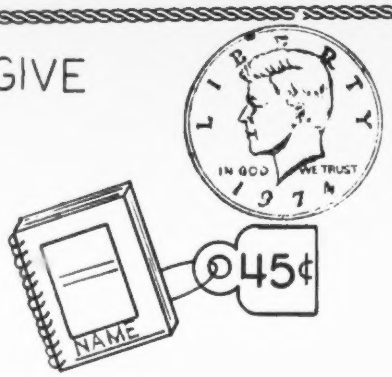
Cut and paste the fewest coins you need to make change.

YOU GIVE


LIBERTY
IN GOD WE TRUST
1974
22¢

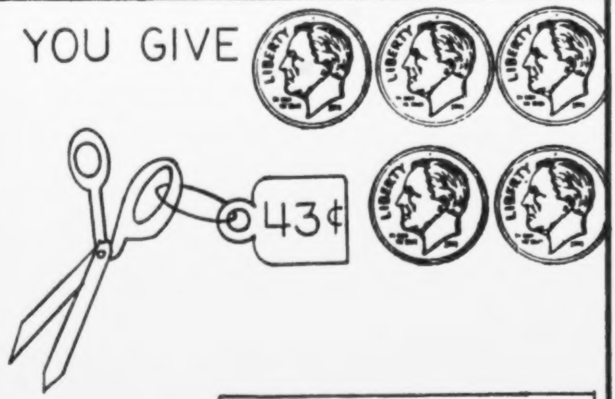
YOUR CHANGE IS

YOU GIVE


LIBERTY
IN GOD WE TRUST
1974
NAME
45¢

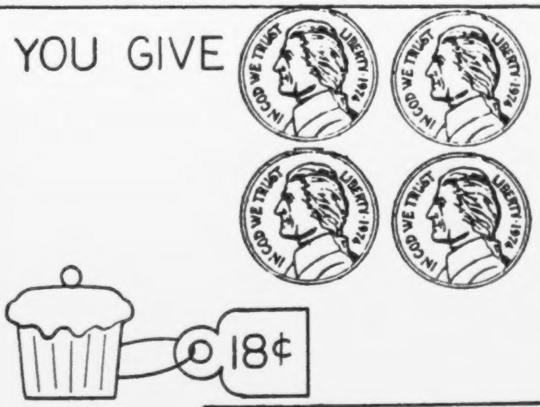
YOUR CHANGE IS

YOU GIVE

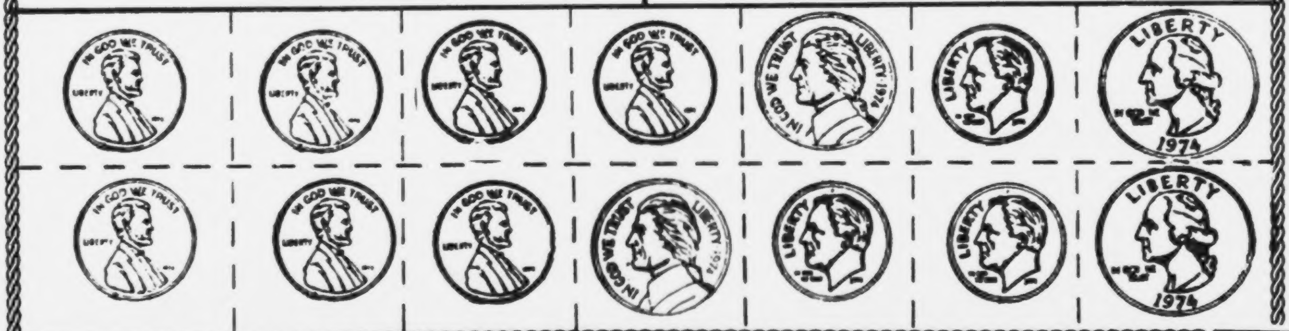


YOUR CHANGE IS

YOU GIVE


IN GOD WE TRUST
LIBERTY
1974
18¢

YOUR CHANGE IS

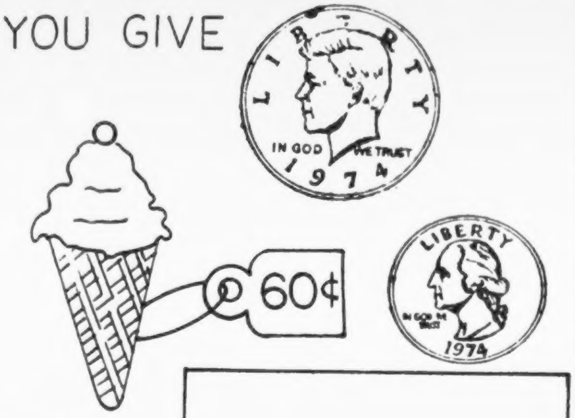

IN GOD WE TRUST
LIBERTY
1974

P.O. 2.10.06.02

NAME: ______________________ CLASS: __________ DATE: ________

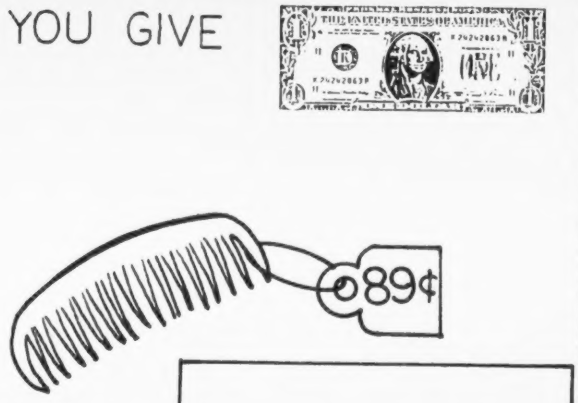
Cut and paste the fewest coins needed to make change.

YOU GIVE



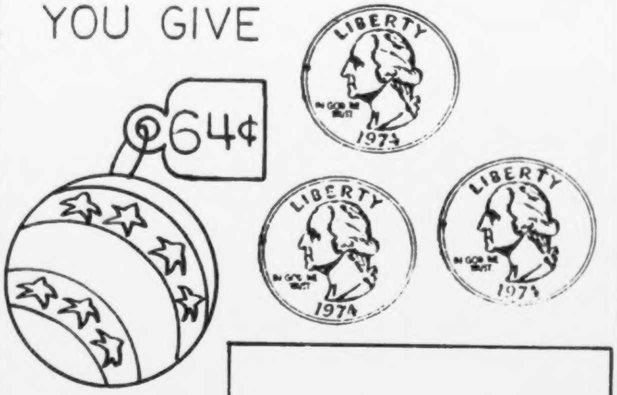
YOUR CHANGE IS

YOU GIVE



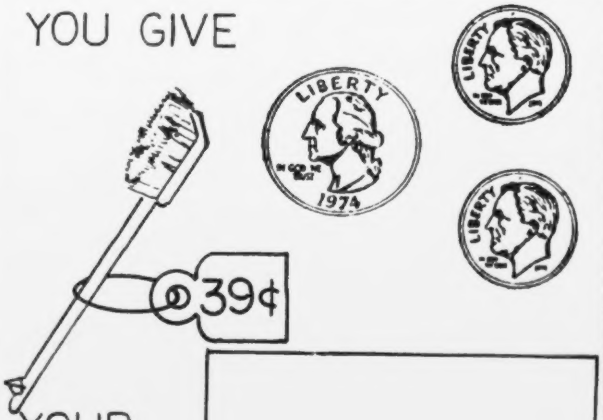
YOUR CHANGE IS

YOU GIVE

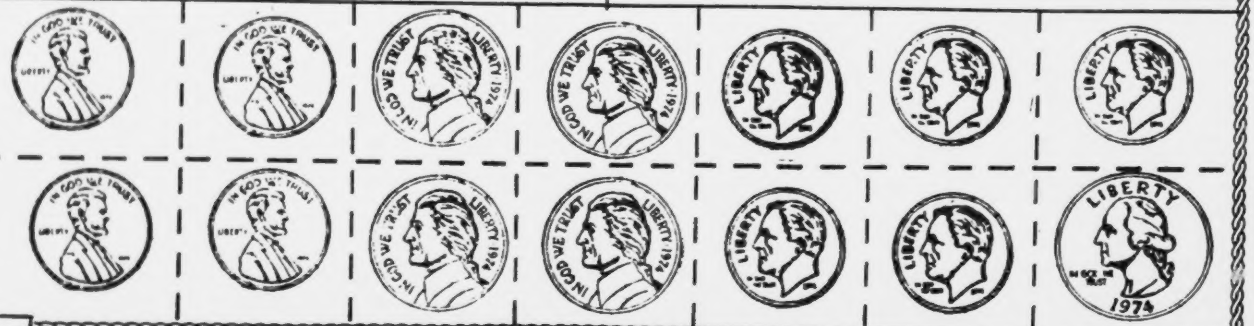


YOUR CHANGE IS

YOU GIVE



YOUR CHANGE IS



Unit 35

2.14.04 FRACTIONS - HALVES, FOURTHS, AND THIRDS

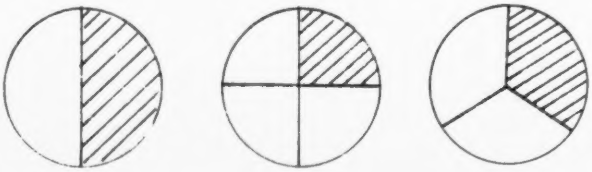
(ongoing)

PERFORMANCE OBJECTIVES

The student will be able to...

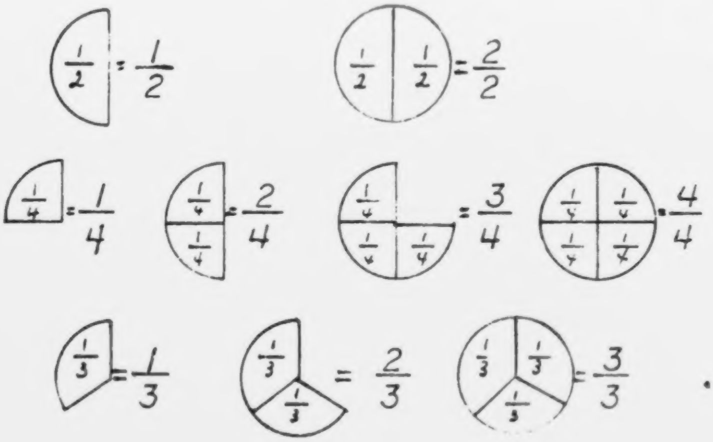
2.14.04.01 separate a concrete object into halves, fourths, and thirds and identify parts as equal;

e.g.,



2.14.04.02 identify and write fractional notation for halves through $\frac{2}{2}$, fourths through $\frac{4}{4}$, and thirds through $\frac{3}{3}$.

e.g.,


$\frac{1}{2} = \frac{1}{2}$
$\frac{1}{2}\ \frac{1}{2} = \frac{2}{2}$
$\frac{1}{4} = \frac{1}{4}$
$\frac{1}{4}\ \frac{1}{4} = \frac{2}{4}$
$\frac{1}{4}\ \frac{1}{4}\ \frac{1}{4} = \frac{3}{4}$
$\frac{1}{4}\ \frac{1}{4}\ \frac{1}{4}\ \frac{1}{4} = \frac{4}{4}$
$\frac{1}{3} = \frac{1}{3}$
$\frac{1}{3}\ \frac{1}{3} = \frac{2}{3}$
$\frac{1}{3}\ \frac{1}{3}\ \frac{1}{3} = \frac{3}{3}$

GETTING STARTED

Prepare and distribute to each student an envelope containing a magazine picture that has been cut into several pieces. Say, "Each envelope has a puzzle. Arrange the pieces to make a complete picture."

Repeat this procedure by asking the students to exchange envelopes.

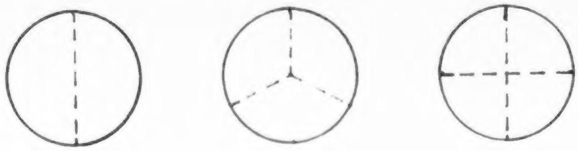
Prepare and distribute to each pair of students an even number of counting chips in three different colors, e.g., 12 yellow, 18 green and 14 blue. Say, "Take all of your yellow chips. Separate the yellow chips into 2 equal piles. How many chips are in each pile? Does each pile have the same number of chips?" Repeat this procedure with the green and the blue chips.

2.14.04

2.14.04.01 **separate a concrete object into halves, fourths and thirds and identify parts as equal**

STRATEGY 1: Prepare and distribute scissors, crayons, and three pre-dotted circles to each student or group of students.

e.g.,



Say, "Compare the circles. How are they the same? ...different? How can you tell?" Display the circle using halves and say, "Find your circle that looks like this and cut it along the dotted line. How many parts do you now have? Are the parts equal? How do you know?" Display each of the parts, in turn, and say, "This is one-half of the whole circle."

Repeat this procedure using the circles divided into thirds and into fourths.

STRATEGY 2: Prepare and distribute scissors, glue, and various symmetrical shapes cut from construction paper to each student or group of students. Say, "Hold up the rectangle which has a dotted line down the middle. Cut along the dotted line. How many parts do you now have? (2) Are the parts equal? How do you know? What do we call each part?" (one-half of the whole rectangle)

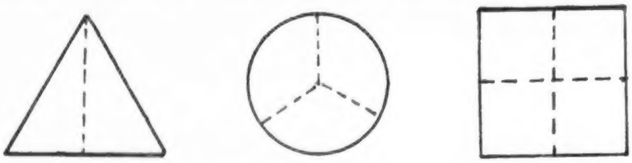
Repeat this procedure with shapes divided into thirds and fourths. Ask the students to name the fractional parts as they are cut from each shape.

2.14.04

2.14.04.02 **identify and write fractional notation for halves through $\frac{2}{2}$, fourths through $\frac{4}{4}$ and thirds through $\frac{3}{3}$**

STRATEGY 1: Prepare and distribute to each student four crayons (red, blue, green and yellow) and a duplicated sheet having various shapes with pre-dotted lines designating halves, thirds and fourths.

e.g.,



Ask the students to identify each shape and its number of equal parts. Say, "How many fractional parts are in the square?" (4) Write 4 on the chalkboard and say, "Color one part of the square red. How many of the parts are now red?" (1) Write 1 above the 4 and draw a horizontal line between the 1 and the 4. ($\frac{1}{4}$) Point to the fraction and say, "The 1 tells us that one part of the square is red and the 4 tells us that there are four equal parts. The red part is one-fourth of the whole square. Write $\frac{1}{4}$ next to this part." Repeat this procedure with the remaining fourths of this square by asking the students to color each of the remaining parts green, yellow, and blue.

Write "red part and green part" on the chalkboard. Say, "How much of this square is red? ($\frac{1}{4}$) ...green? ($\frac{1}{4}$) ... red and green? ($\frac{2}{4}$) Together these parts make up $\frac{2}{4}$ of this square." Write the symbol $\frac{2}{4}$ next to the words "red and green parts." Ask the students to write other color combinations which show $\frac{2}{4}$, e.g., blue and yellow parts. Extend the color combinations to include $\frac{3}{4}$ and $\frac{4}{4}$.

STRATEGY 1: con't

Repeat this procedure using the other shapes to show $\frac{1}{2}$, $\frac{2}{2}$, $\frac{1}{3}$, $\frac{2}{3}$, and $\frac{3}{3}$.

STRATEGY 2:

Prepare and display a flannelboard and pictures which have been cut into halves, fourths, or thirds. Place a picture of a cupcake cut into halves on the flannelboard. Say, "Andrea had a cupcake that she wanted to share with her friend Joan. Into how many equal pieces must the cupcake be cut?" (2) Show the two parts of the cupcake and say, "What part of the cupcake will Andrea get?" ($\frac{1}{2}$) Ask a student to write the fractional notation on the chalkboard. Say, "What part of the cupcake will she give to Joan?" ($\frac{1}{2}$) Ask another student to write the fractional notation on the chalkboard. Say, "How much of the cupcake was eaten?" ($\frac{2}{2}$) Ask a student to write the fractional notation on the chalkboard.

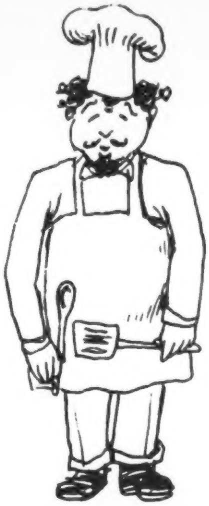
Repeat this procedure varying the items pictured and the fractional parts that are named and written.

Variation: Ask the students to make up their own stories and to call on other students to write the fractions on the chalkboard.

P.O. 2.14.04.01

NAME:______________________ CLASS:__________ DATE:__________

Follow the directions below.



Charles baked three pizzas.

On Monday he cut a pizza in half.

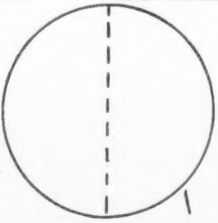
On Tuesday he cut a pizza into thirds.

On Wednesday he cut a pizza into fourths.

Match the word with the pizza.

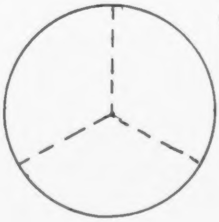
Match the sentence with the pizza.

fourths



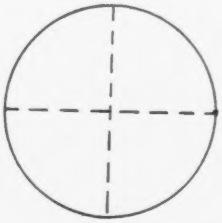
I have 3 equal parts.

halves



I have 4 equal parts.

thirds



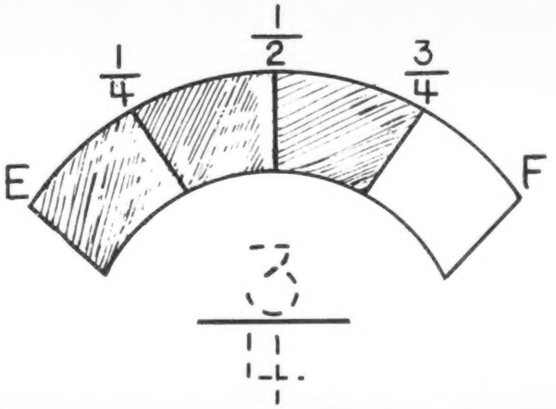
I have 2 equal parts.

P.O.2.14.04.02

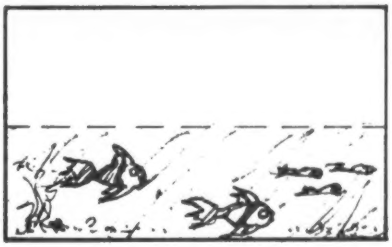
NAME: ______________________ CLASS: ________ DATE: ________

Write the fraction that answers each question.

How full is the gas tank?

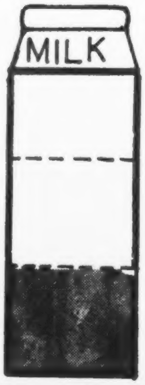


How full is the fish tank?



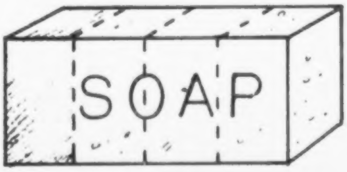
___

How full is the milk container?



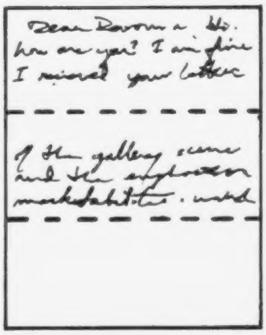
___

What part of the soap is shaded?



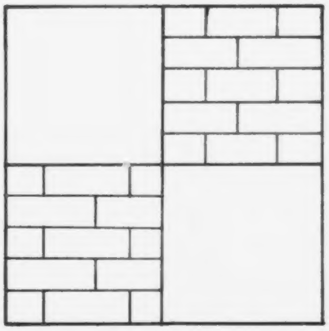
___

What part of the page has writing?



___

What part of the floor is tiled?



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2.04.01 MULTIPLICATION FACTS FOR TWOS THROUGH 10

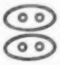
(2-3 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

*2.04.01.01A show groups of two through 5 groups of two;

e.g.,

2 groups of two 

2.04.01.02A count by twos through 10;

e.g.,

1 two (2), 2 twos (4), 3 twos (6),
4 twos (8), 5 twos (10)

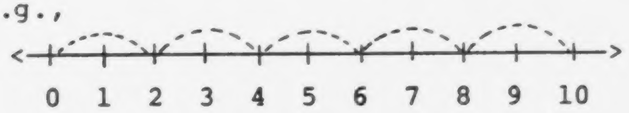
2.04.01.03A demonstrate that multiplication is the process of repeated addition of like addends;

e.g.,

2 + 2 + 2 = 3 groups of two

2.04.01.04A use a number line to demonstrate counting by twos through 10;

e.g.,



$$\begin{aligned} & 2 + 2 + 2 + 2 + 2 \\ &= 5 \text{ groups of } 2 \\ &= 10 \end{aligned}$$

*2.04.01.05A recognize x as the symbol for multiplication.

e.g.,

$$\begin{aligned} & 2 + 2 + 2 \\ &= 3 \text{ groups of } 2 \\ &= 3 \quad \text{x} \quad 2 \\ &= 6 \end{aligned}$$

2.04.01

VOCABULARY

TERMS	SYMBOLS
multiply	x
once	
twice	
times	

GETTING STARTED

Ask five students to each choose a partner and to line up in front of the classroom. Say, "Let's add the students to see how many have partners. How many students are in each pair? (2) How many pairs are there?" (5) Write 2 + 2 + 2 + 2 + 2 = ___ on the chalkboard. Ask a student to complete the addition example.

Repeat this procedure using other examples of repeated addition.

Clap your hands once and say, "How many times did I clap?" Clap twice and say, "How many times did I clap? I am going to clap in groups. Listen carefully." Clap twice, wait, clap twice and say, "How many groups of claps did you hear?" Repeat the clapping and say, "We only want to count the number of groups."

Repeat this procedure with two, three, four, and five groups of two claps each.

2.04.01

2.04.01.01 **show groups of two through 5 groups of two**

STRATEGY 1: Prepare and display a chart with happy faces.

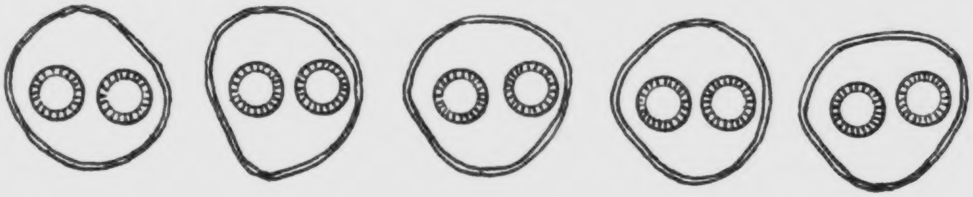
e.g.,

two	☺ ☺
four	☺ ☺ ☺ ☺
six	☺ ☺ ☺ ☺ ☺ ☺
eight	☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺
ten	☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺

Say, "How many groups of two happy faces do you see near the word, 'two'? (1) Ask a student to circle the group of two. Say, "How many groups of two happy faces do you see near the word, 'four'?" (2) Ask a student to circle both groups of two. Continue this procedure until five groups of happy faces are circled near the word, 'ten'.

STRATEGY 2: Distribute 10 chips and 5 large rubberbands to each student or pair of students. Draw 5 circles on the chalkboard to represent the rubberbands. Say, "Place the rubberbands on your desk so they resemble the circles on the chalkboard. Place two chips inside one rubberband." (Demonstrate.) You have shown one group of 2 chips. Now show another group of 2 chips inside the next rubberband. Now you have 2 groups of two chips." Continue this procedure through 5 groups of two.

e.g.,

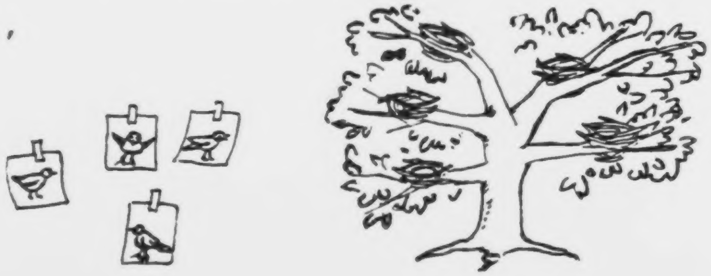


2.04.01

2.04.01.02 **count by twos through 10**

STRATEGY 1: Prepare tape and small pictures of birds. Display a tree with 5 branches and one nest on each branch.

e.g.,



Say, "Two birds share each nest. Let's place the birds in their nests." Ask several students to tape the birds to the tree, two to a nest. Say, "Let's count by twos to see how many birds live in this tree."

Repeat the procedure of counting by twos, either individually, in pairs, or as a group until all the students have counted by twos through ten.

STRATEGY 2: Distribute ten chips to each student or group of students. Say, "We will count our chips in a special way. Place one chip on top of another. How many chips are in the pile? (2) Arrange the rest of your chips in piles of two. What is the special way we can count these chips?" (We can now count them by twos.) Ask the students to touch each pile as they count by twos through 10.

Give individual students and pairs of students an opportunity to repeat this procedure until they are counting with ease.

2.04.01.03 demonstrate that multiplication is the process of repeated addition of like addends

STRATEGY 1: Display six discs in a scattered arrangement. Say, "I want to arrange these discs in groups of two." Ask a student to arrange the discs in three groups of two and draw a ring around each group. Touch each group as you say, "Two plus two plus two. Each group has the same number of discs." Write 2 + 2 + 2 = 6 on the chalkboard. Say, "Because we are adding the same number, this addition example can be written as a multiplication example. How many rings did we draw? (3) How many discs are on each ring? (2) We can write two plus two plus two, or 3 groups of two, equals 6."

e.g.,

 2 + 2 + 2
=3 groups of two
=6

Repeat this procedure with other groups of two.

STRATEGY 2: Ask two students to hold hands as partners. Ask two other students to form partners behind the first pair. Continue until there are 8 students (4 pairs). Say, "How many groups of students do we have?" Ask the students to hold up their clasped hands. Touch each pair of hands as you count the four groups. Say, "There are four sets of partners. How many students are in each set? (2) We have 4 sets of partners or four groups with two students in each group. On the chalkboard, write

 2 + 2 + 2 + 2
=4 groups of 2
=8

STRATEGY 2: cont'd

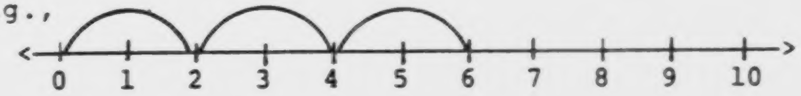
When we add the same number many times, we can use multiplication instead of addition.

Repeat this procedure with up to 5 pairs of students.

2.04.01.04 **use a number line to demonstrate counting by twos through 10**

STRATEGY 1: Prepare colored chalk. Draw a number line from 0 through 10 on the chalkboard. Say, "Peter Rabbit is at home. His home is at zero. He wants to visit his friend who lives at number 6. How do rabbits move? (They hop.) Peter likes to save time so he hops two spaces at a time. How many hops will it take for him to reach number 6?" (3) Ask a student to use colored chalk to illustrate Peter's hops.

e.g.,



Say, "How many hops did Peter make?" (3) On the chalkboard, write 3 hops of two
=3 groups of two
=6.

Repeat this procedure using other groups of twos.

STRATEGY 2: Prepare masking tape and chalk to construct a large 0 through 10 number line on the classroom floor. Ask a student to stand at zero and move two numbers for each step up to 8. Ask a student how many steps it took to reach 8. (4) As the student moves, the other students should count each step. Write, 4 groups of 2 = 8 on the chalkboard.

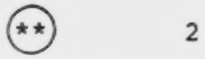
Repeat this procedure using other students.

2.04.01

2.04.01.05 **recognize x as the symbol for multiplication**

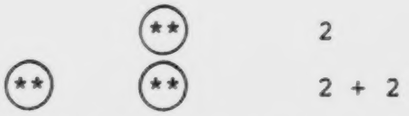
STRATEGY 1: Prepare 15 paper circles, each with 2 stars on the front and tape on the back. Say, "Let's see how many groups of stars we have. (Display one circle.) How many stars are in this group?" (2) Write a 2 next to the circle.

e.g.,



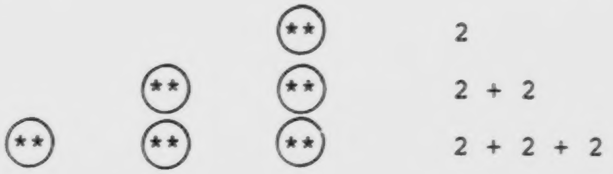
Place two circles beneath the first one. Say, "How many stars are in each circle?" (2) Write 2 + 2 next to the circles.

e.g.,



Place three circles beneath the two. Say, "How many stars are in each circle? (2) Write 2 + 2 + 2 in this group.

e.g.,

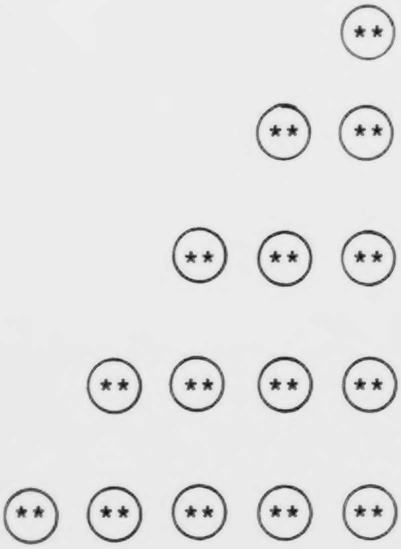


Continue this procedure through 5 groups of 2. Say, "There is an easier way to add many addends having the same number." Draw a large X on the chalkboard. Say, "This is the symbol for multiplication. We read it as 'times'. Multiplication is a short cut for repeated addition. Look at the first group of stars. How many stars are in that group?" (2) Write 1 group of two = 2 = 1 x 2. Go to the next group. Say "How many groups?" (2) How many stars in each

STRATEGY 1:
cont'd

group? (2) Write 2 groups of two = 2 + 2 = 2 x 2 . Continue this procedure through 5 groups of two.

e.g.,



1 group of two
= 1 x 2
= 2

2 + 2
= 2 groups of two
= 2 x 2
= 4

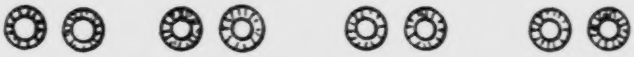
2 + 2 + 2
= 3 groups of two
= 3 x 2
= 6

2 + 2 + 2 + 2
= 4 groups of two
= 4 x 2
= 8

2 + 2 + 2 + 2 + 2
= 5 groups of two
= 5 x 2
= 10

STRATEGY 2: Prepare and distribute ten discs to each student or group of students. Say, "Arrange 8 discs in 4 equal groups of two."

e.g.,



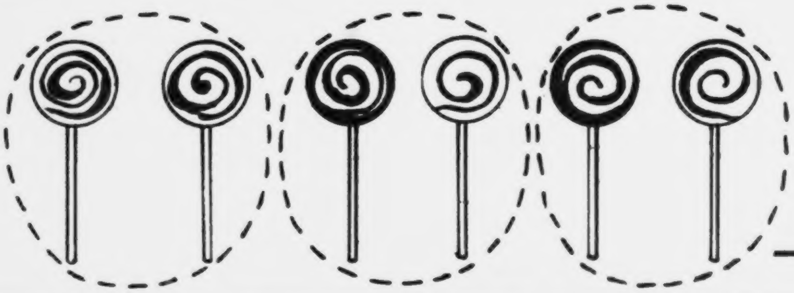
Write, 2 + 2 + 2 + 2 = 8 on the chalkboard. Say, "There is another way to write a number sentence for your discs." Write 'X' on the chalkboard. Say, "X means times or multiplication. How many times did we add the number 2? (4) We can say 2 + 2 + 2 + 2 is the same as 4 groups of two or 4 x 2. This is multiplication."

Repeat this procedure using other repeated addition examples.

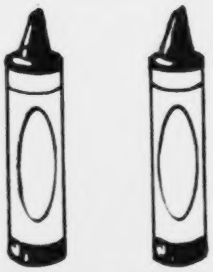
P.O. 2.04.01.01

NAME:______________________________________ CLASS:_____ ____ DATE:_______

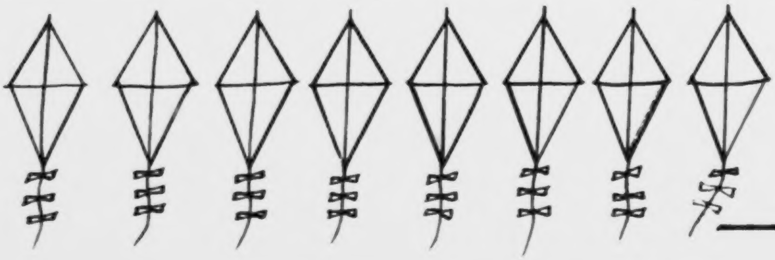
Circle groups of two. How many groups of two did you circle each time?



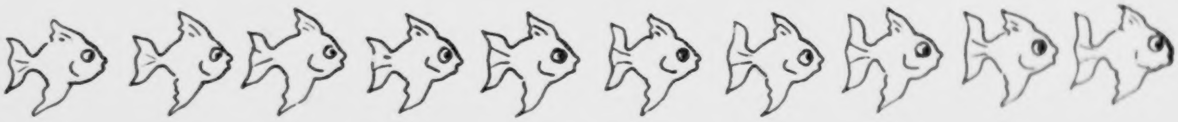
____ groups of two



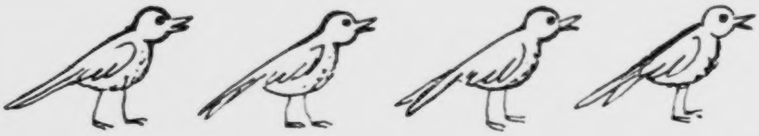
____ group of two



____ groups of two



____ groups of two

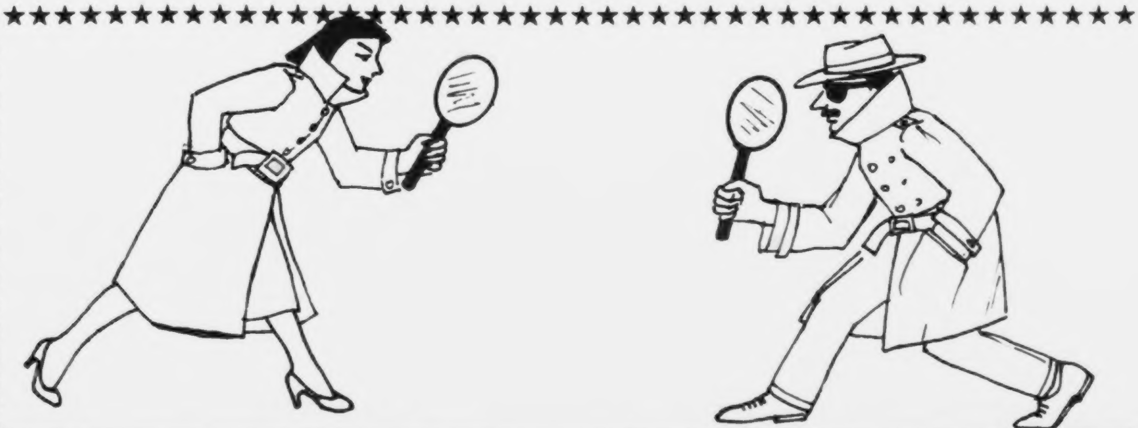


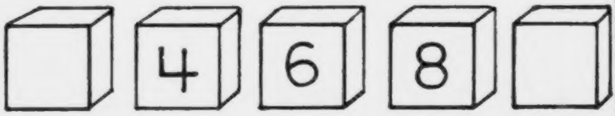
____ groups of two

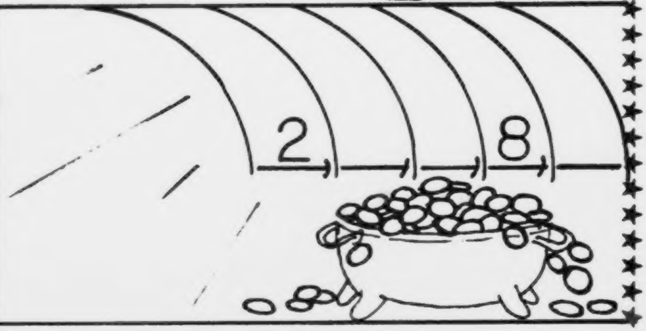
P.O. 2.04.01.02

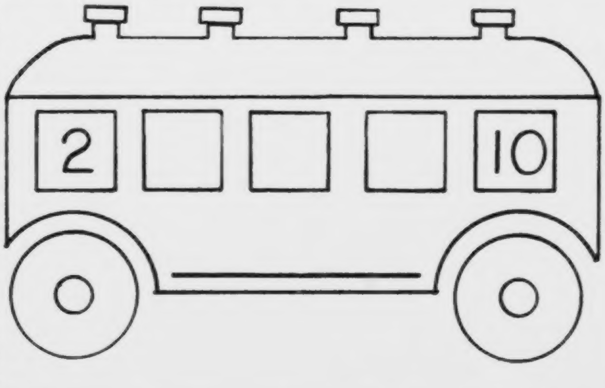
NAME: ______________________ CLASS: __________ DATE: ________

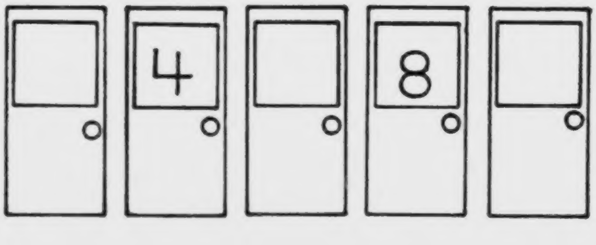
Help the detectives find the missing numbers. Count by twos.











DO YOU REMEMBER?

Name the Shape

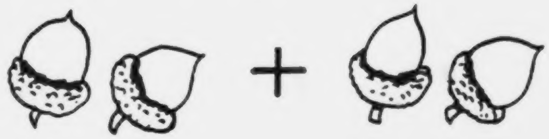
I have 4 sides and 4 square corners.
My 2 short sides are equal in length.
My 2 long sides are equal in length.

I am a ______________________.

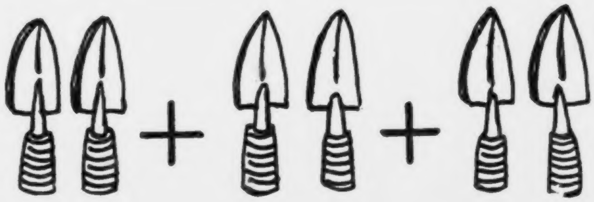
P.O. 2.04.01.03

NAME:______________________________ CLASS:__________ DATE:________

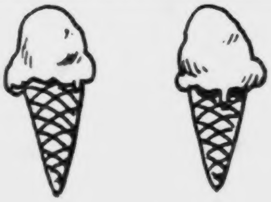
Complete each number story.



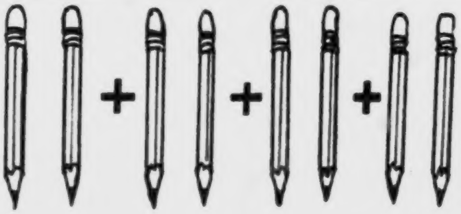
2 + 2 = 2 groups of two



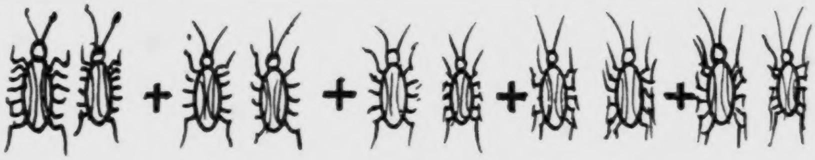
___+___+___= ___groups of two



____ = ____group of two



___+___+___+___= ____ groups of two

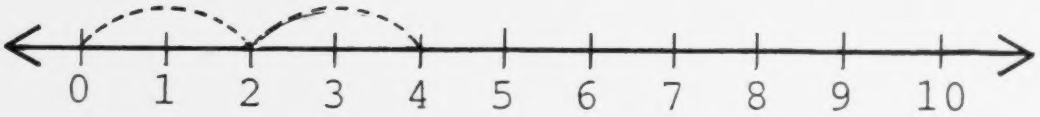


____+___+___+___+___= ____ groups of two

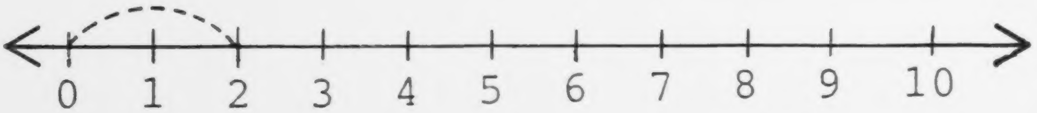
P.O. 2.04.01.04

NAME: ______________________ CLASS: ________ DATE: ________

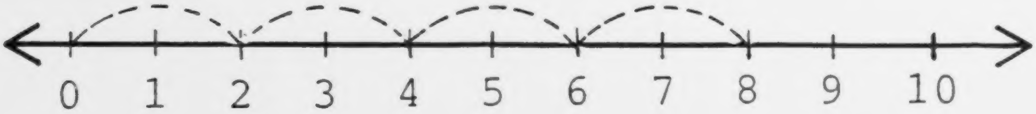
Use the number lines to count by twos.


0 1 2 3 4 5 6 7 8 9 10

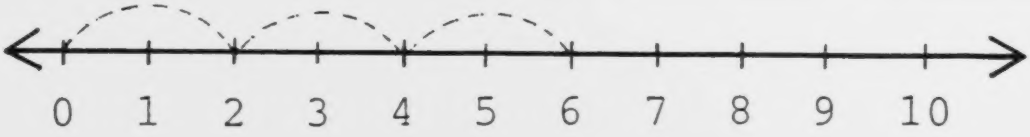
2 groups of two = 4


0 1 2 3 4 5 6 7 8 9 10

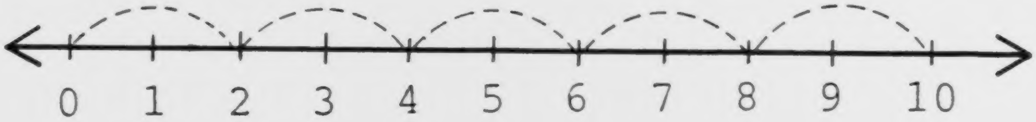
____ group of two = ____


0 1 2 3 4 5 6 7 8 9 10

____ groups of two = ____


0 1 2 3 4 5 6 7 8 9 10

____ groups of two = ____

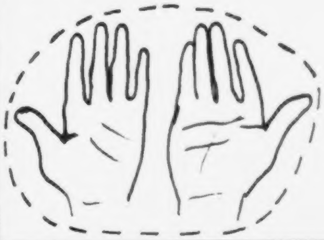

0 1 2 3 4 5 6 7 8 9 10

____ groups of two = ____

P.O. 2.04.01.05

NAME: ____________________ CLASS: ________ DATE: ________

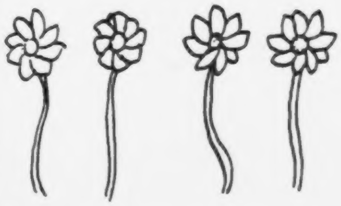
Circle groups of two. Complete each number story.



____ = 2

____ group of two = 2

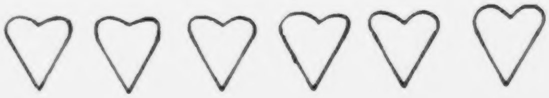
1 × 2 = 2



____ + ____ = ____

____ groups of two = ____

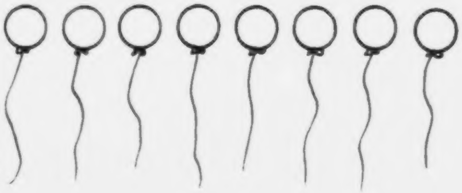
____ × 2 = ____



____ + ____ + ____ = ____

____ groups of two = ____

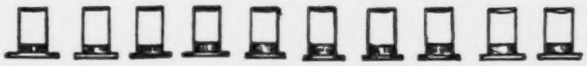
____ × 2 = ____



____ + ____ + ____ + ____ = ____

____ groups of two = ____

____ × 2 = ____



____ + ____ + ____ + ____ + ____ = ____

____ groups of two = ____

____ × 2 = ____

DO YOU REMEMBER?

Paul rode his bicycle 16 miles on Saturday.
He rode 8 miles on Sunday.
How many miles did he ride on both days?

Solve

Unit 37

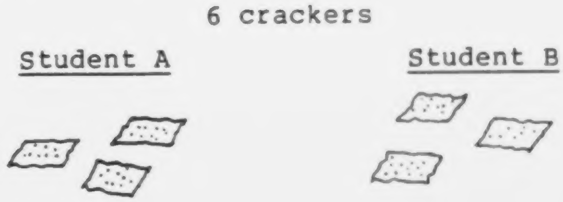
2.05.01 INTRODUCTION TO DIVISION

(2 lessons)

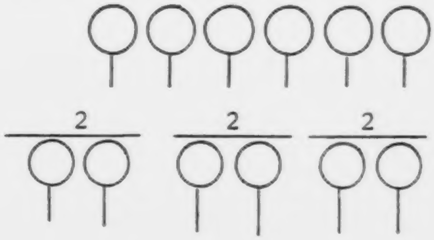
PERFORMANCE OBJECTIVES

The student will be able to...

2.05.01.01B demonstrate that division is a process of sharing;
e.g.,



2.05.01.02B demonstrate that division is the process of repeated subtraction;
e.g.,



2.05.01.03B solve story problems related to skills learned in this module.
e.g.,

> Tom has six toy trucks. If one toy garage holds three trucks, how many garages does he need to park all of his trucks?

2.05.01

VOCABULARY

TERMS

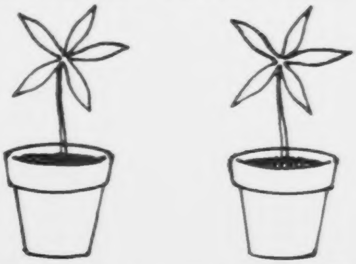
divide
division
separation
sharing

GETTING STARTED

Draw a number line from 0 through 10 on the floor or on the chalkboard. Say, "When it is your turn, take giant steps of two spaces at a time until you land on ten. How many steps did you take?" (5) Repeat this procedure for other groups of 2.

Draw two flower pots, with one flower in each pot, on the chalkboard. Each flower should have five petals.

e.g.,



Say, "How many petals are on each flower? How many petals in all?" Write 2 flowers have a total of 10 petals. Repeat this procedure using other examples through 5 flowers with a total of 25 petals.

2.05.01

2.05.01.01 **demonstrate that division is a process of sharing**

STRATEGY 1: Prepare and distribute 25 counters to each pair or group of students. Say, "Take 12 counters. Share the counters equally with your partner. How many groups will you make? (2) How many counters will be in each group?" (6) When 12 counters are shared by two people, there will be six counters in each group. There are 2 groups of six in 12."

Repeat this procedure using other groups through five groups of 5.

STRATEGY 2: Prepare and display an orange or facsimile cut into six equal parts. Ask three students to share the pieces equally. Say, "How many pieces does each student have? (Each student has 2 pieces). There are 3 groups of two in 6."

Repeat this procedure using other objects.

2.05.01.02: **demonstrate that division is the process of repeated subtraction**

STRATEGY 1: Prepare and display 8 books. Say, "I would like to give out these books, two at a time, to as many students as I can. How many students will get books?" Write the students' estimates on the chalkboard. Ask a student to count the books and write the amount (8) on the chalkboard. Give him/her 2 books. Say, "I gave out 2 books. How many are left?" (6) Write the example on the chalkboard.

e.g., 8 books

- 2 books given to one student

6 books left

STRATEGY 1: cont'd

Repeat this procedure with other students until all the books have been distributed and the example on the chalkboard shows repeated subtractions.

e.g.,

$$\begin{array}{rl} 8 & \text{books} \\ \underline{-2} & \text{books} \\ 6 & \text{books left} \\ \underline{-2} & \text{books} \\ 4 & \text{books left} \\ \underline{-2} & \text{books} \\ 2 & \text{books left} \\ \underline{-2} & \text{books} \\ 0 & \text{books left} \end{array}$$

Say, "How many students received 2 books? (4) When we divided 8 books into groups of 2, we had 4 groups of books." Compare the result with the students' original estimates.

Repeat this procedure with other sets of books.

STRATEGY 2: Ask 10 students to come to the front of the classroom. Ask a student to write the number 10 on the chalkboard. Say, "These ten students will form teams of two." Ask 2 of the 10 students to stand apart from the group. Say, "This is one team of two students. How many students are left?" (There are 8 students left.) Continue this procedure until 5 teams of 2 have been formed. Say, "How many teams of 2 were formed from 10 students? (5) When we divided 10 students into teams of 2 we formed 5 teams."

Demonstrate at the chalkboard that the same conclusion could have been reached by using repeated subtraction.

e.g.,

$$\begin{array}{rlrlrl} 10 & \text{students} & 8 & \text{students} & \ldots\ 2 & \text{students} \\ \underline{-2} & \text{students} & \underline{-2} & \text{students} & \underline{-2} & \text{students} \\ 8 & \text{students left} & 6 & \text{students left} & 0 & \text{students left.} \end{array}$$

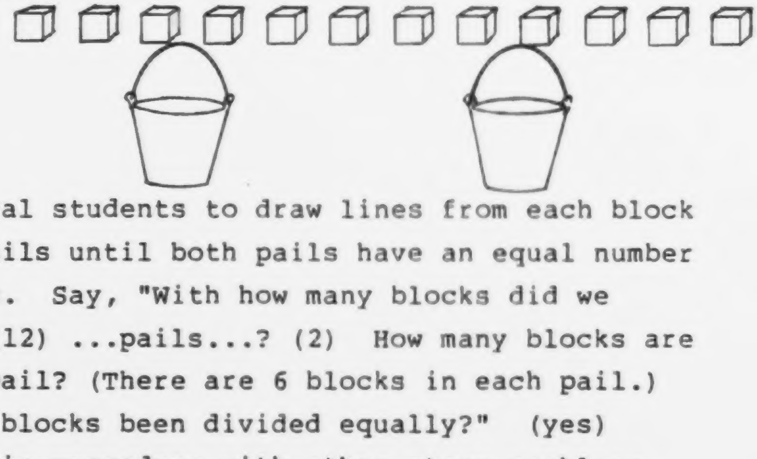
STRATEGY 2: cont'd

Say, "How many times did we subtract 2? (5) We can form 5 teams of 2 students from a group of 10 students."
Repeat this procedure with other groups of students, e.g., 12 students forming teams of 3.

2.05.01.03 **solve story problems related to skills learned in this module**

STRATEGY 1: Prepare three boxes and twelve discs. Say, "Father has 12 cookies to place equally in three lunch boxes. How many cookies will he place in each?" Ask a student to be the father and place an equal number of cookies in each box. Say, "How many cookies are in each lunch box? Who can give us a sentence, using numbers, to tell what was done?" (There are 3 groups of four in 12.)
Repeat this procedure with other story problems.

STRATEGY 2: Say, "Frank has twelve blocks. His mother asks him to place the blocks in two pails so he can carry them upstairs. She tells him to place an equal number of blocks in each pail so they will be easy to carry. How many blocks will Frank place in each pail?" Draw two pails and twelve blocks on the chalkboard.
e.g.,

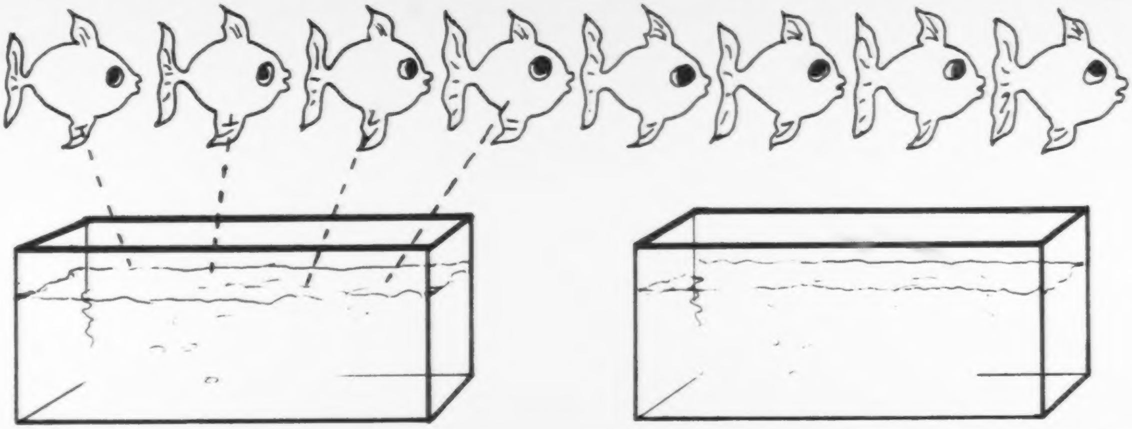


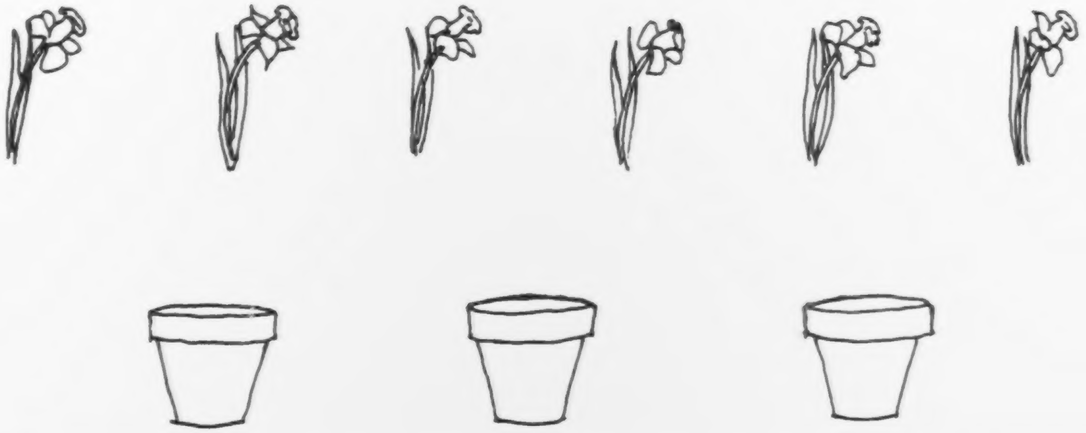
Ask several students to draw lines from each block to the pails until both pails have an equal number of blocks. Say, "With how many blocks did we start? (12) ...pails...? (2) How many blocks are in each pail? (There are 6 blocks in each pail.) Have the blocks been divided equally?" (yes)
Repeat this procedure with other story problems.

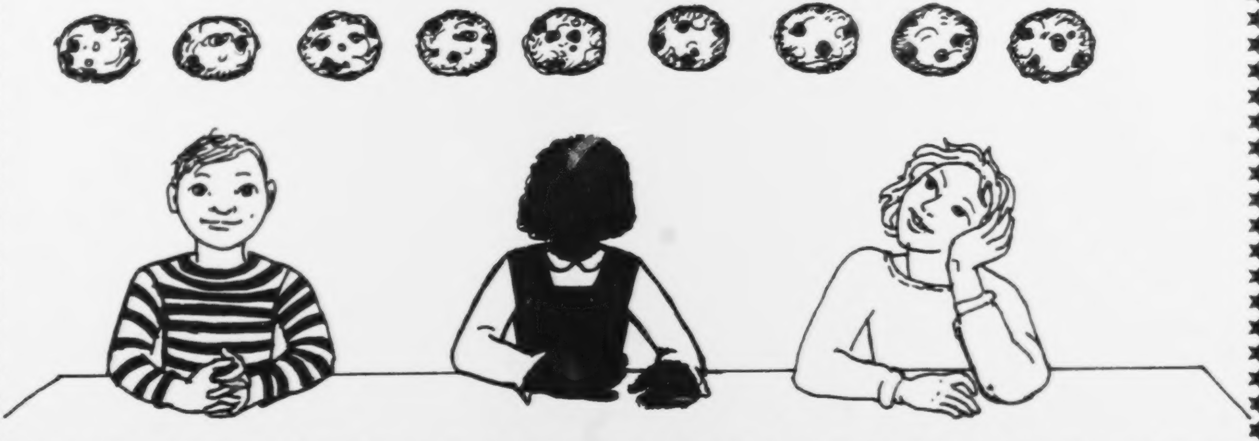
P.O. 2.05.01.01

NAME: ______________________ CLASS: __________ DATE: ________

Place an equal number of fish in each tank.
Place an equal number of flowers in each vase.
Give each student an equal number of cookies.







P.O. 2.05.01.02

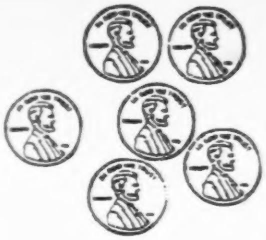
NAME: ______________________ CLASS: ________ DATE: ________

Solve each problem by using repeated subtraction.

1. You have 6¢.
How many 2¢ gumballs can you buy?

_____ gumballs

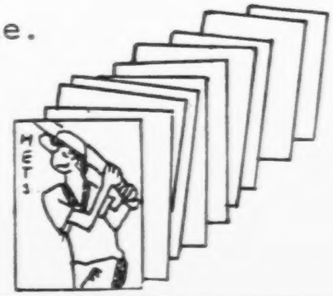
$$\begin{array}{r} 6\text{¢} \\ -\,2\text{¢} \\ \hline 4\text{¢} \end{array} \nearrow \begin{array}{r} 4\text{¢} \\ -\,2\text{¢} \\ \hline \boxed{}\,\text{¢} \end{array} \nearrow \begin{array}{r} \boxed{}\,\text{¢} \\ -\,2\text{¢} \\ \hline \boxed{}\,\text{¢} \end{array}$$



2. You have 10 baseball cards.
You want to put 5 cards in each pile.
How many piles can you make?

_____ piles

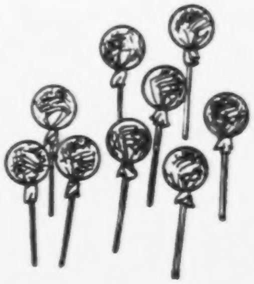
$$\begin{array}{r} 10 \\ -\,5 \\ \hline \boxed{} \end{array} \nearrow \begin{array}{r} \boxed{} \\ -\,\boxed{} \\ \hline \boxed{} \end{array}$$



3. You have 9 lollipops.
You want to give 3 lollipops to each friend.
How many friends will get lollipops?

_____ friends

$$\begin{array}{r} 9 \\ -\,3 \\ \hline \boxed{} \end{array} \nearrow \begin{array}{r} \boxed{} \\ -\,\boxed{} \\ \hline \boxed{} \end{array} \nearrow \begin{array}{r} \boxed{} \\ -\,\boxed{} \\ \hline \boxed{} \end{array}$$



DO YOU REMEMBER?

Solve | Check

$$\begin{array}{r} 25 \\ +\;\;6 \\ \hline \end{array}$$

Solve | Check

$$\begin{array}{r} 39 \\ +\;\;8 \\ \hline \end{array}$$

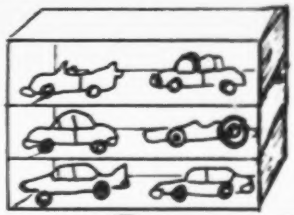
P.O. 2.05.01.03

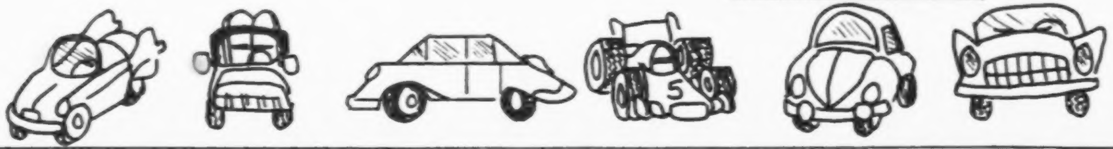
NAME:______________________________ CLASS:________ DATE:________

Read and solve each story problem.

Jerry has 6 toy cars.
Each box can hold 2 cars.
How many boxes does he need for all of his cars?

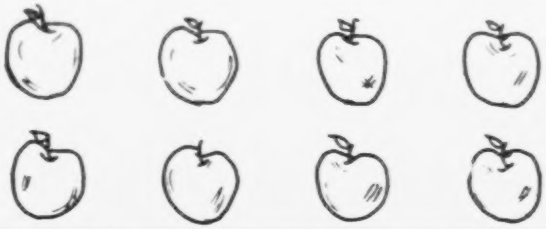
3 boxes





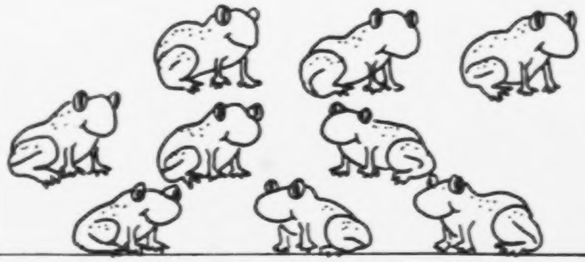
1. Mother has 8 apples. She can put 2 apples in each basket. How many baskets does she need?

_____ baskets



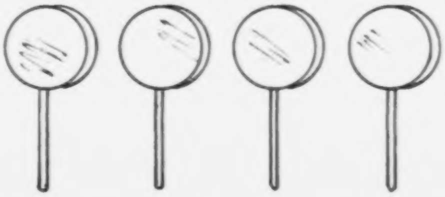
2. There are 9 frogs. Three frogs are on each log. How many logs are there?

_____ logs



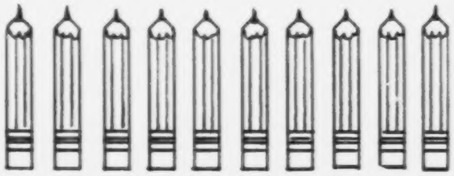
3. There are 4 lollipops. Each youngster gets 2 lollipops. How many youngsters are there?

_____ youngsters



4. There are 10 pencils. Two pencils are in each box. How many boxes are there?

_____ boxes



2.05.02 DIVISION FACTS FOR TWOS THROUGH 10

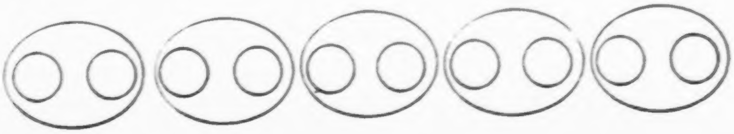
(1-2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

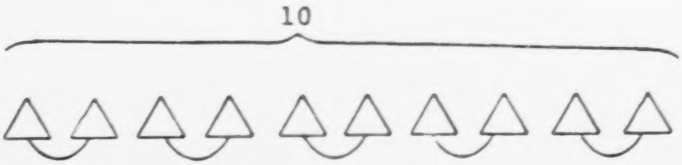
2.05.02.01A separate up to 10 objects into groups of two without a remainder;

e.g.,



2.05.02.02A determine the number of groups of two that can be formed from an even numbered group of objcts up to 10;

e.g.,



5 groups of 2

*2.05.02.03A solve story problems related to skills learned in this module.

e.g.,

There are 8 apples in a basket. Sara puts 2 apples on each napkin. How many napkins does she need?

2.05.02

VOCABULARY

TERMS

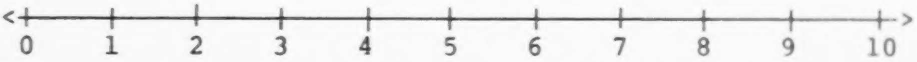
separate

GETTING STARTED

On the chalkboard draw a clothesline with five pairs of socks. Say, "How many pairs of socks are there? How many socks are there altogether?" Point to each pair and ask the students to write the number of socks under each pair, e.g., 2 socks, 4 socks, 6 socks, ...10 socks.

Repeat this procedure with pairs of gloves and pairs of shoes.

Draw or display a number line on the chalkboard.
e.g.,



Prepare a picture of a frog. Place the frog on 0 and say, "This is Freddy, the frog. Freddy loves to jump and catch bugs. Let's jump with Freddy." Move the frog along the number line and count 1, 2, 3... 10 bugs. Ask a student to place the frog on 0 and say, "Freddy will jump again. This time, with each jump, Freddy will catch two bugs. Help Freddy jump to 2 on the number line. How many jumps did Freddy make? (1) How many bugs did Freddy catch? (2) Now place the frog on 4. How many jumps did Freddy make? (2) How many bugs did Freddy catch?" (2 more or 4 altogether) Repeat this procedure through five jumps.

2.05.02

2.05.02.01 **separate up to 10 objects into groups of two without a remainder**

STRATEGY 1: Prepare a flannel board, ten apple cutouts, and five basket cutouts. Place the five baskets on the bottom of the flannelboard. Place six apple cutouts on the flannelboard. Say, "I have six apples. I want to put two apples in each basket. How many baskets will I use?" Place two apples in the first basket. Say, "How many baskets did I fill? (One basket was filled.) How many apples are left?" (Four apples are left.) Fill the other baskets while asking the same questions. Repeat this procedure for eight, two, four, and ten apples.

STRATEGY 2: Distribute an egg carton and 10 counters to each student. Say, "Take 8 counters out and place two counters in each compartment of your egg carton. How many sections of the carton did we use? (4) Repeat this activity for two, four, six, and ten counters.

2.05.02.02 **determine the number of groups of two that can be formed from an even numbered group of objects up to 10**

STRATEGY 1: Prepare and display apple cutouts on a flannel board. Show six apples and then separate them into groups of two. Say, "How many apples are there in all? (6) How many groups of two?" (3)

Repeat this procedure with 2, 4, 8 and 10 apple cutouts.

STRATEGY 2: Distribute pegboards and ten pegs to each student or group of students. Say, "Take six pegs and place them in rows with two pegs in each row. How many pegs did we use in all? (6) How many groups of two did we make?" (We made 3 groups of 2 pegs.)

Write the following on the chalkboard.

There are 6 pegs in all.
There are 2 pegs in each row.
There are 3 groups of two pegs.

Say, "Take eight pegs and place them in rows with two pegs in each row. How many pegs in all? (8) How many groups of two did we make?" (We made 4 groups of 2 pegs.)

Write the following on the chalkboard.

There are 8 pegs in all.
There are 2 pegs in each row.
There are 4 groups of two pegs.

Repeat this procedure using two, four, and ten pegs.

2.05.02.03 solve story problems related to skills learned in this module

STRATEGY 1: Prepare 10 cookies and 5 paper plates. Say, "Mrs. Blue is a baker. She likes to give cookies to all the youngsters in the neighborhood. Today she has eight cookies and wants to give two cookies to each youngster. How many youngsters can she treat?"

Ask a student to take eight cookies and place two cookies on each paper plate. Say, "How many paper plates have cookies?" (There are 4 paper plates with 2 cookies on each plate.)

Repeat this procedure with other story problems.

STRATEGY 2: Distribute an egg carton and ten buttons to each student or group of students. Say, "Tom has ten

STRATEGY 2: cont'd

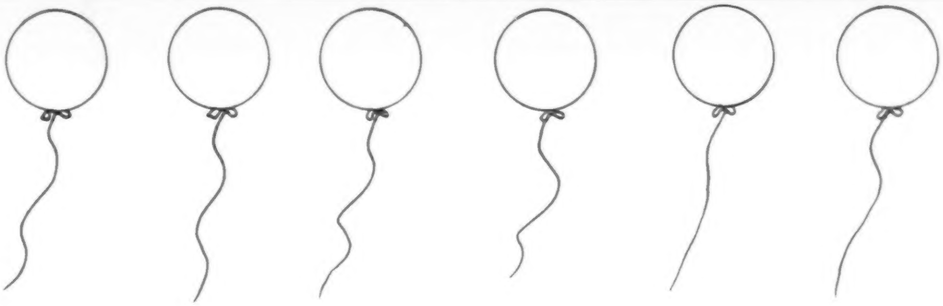
buttons. He is going to give two buttons to each person he sees. To how many people can he give buttons? Suppose each section in your egg carton represents a person. Place two buttons in each section of your egg carton until you have used all of your buttons. To how many people can Tom give his buttons?" (Tom can give buttons to 5 people.)

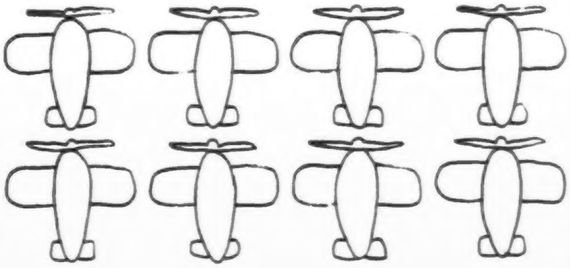
Repeat this procedure using other story problems.

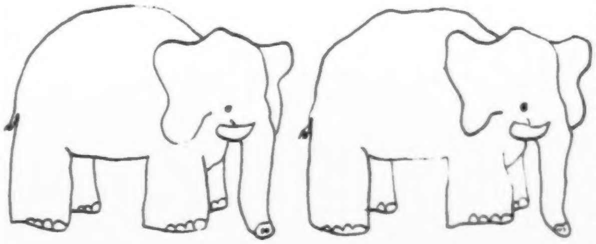
P.O. 2.05.02.01

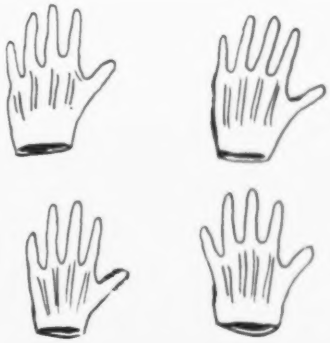
NAME: ____________________ CLASS: ________ DATE: ________

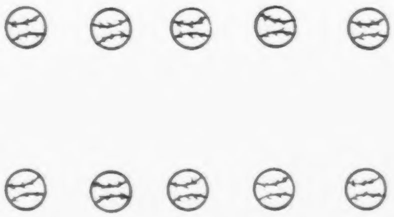
Circle groups of 2.











DO YOU REMEMBER?

This month is ______________________.

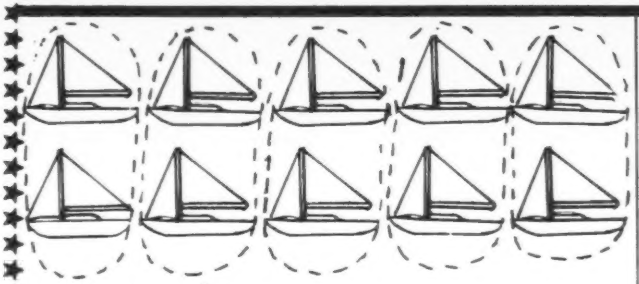
Last month was ______________________.

Next month will be ______________________.

P.O. 2.05.02.02

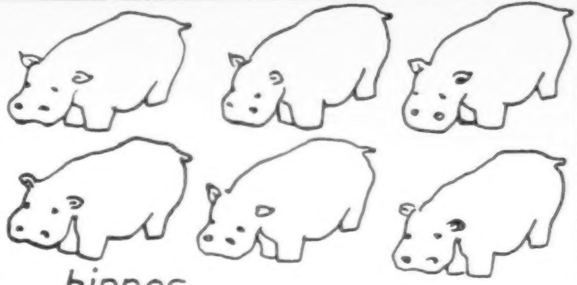
NAME:________________________________CLASS:________DATE:________

Count and write the number of objects on the top line. Circle groups of 2. Write the number of groups on the bottom line.



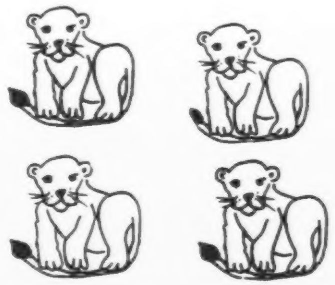
10 boats

5 groups of 2



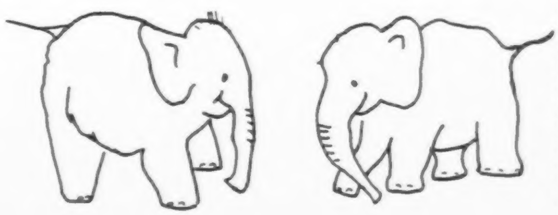
__ hippos

__ groups of 2



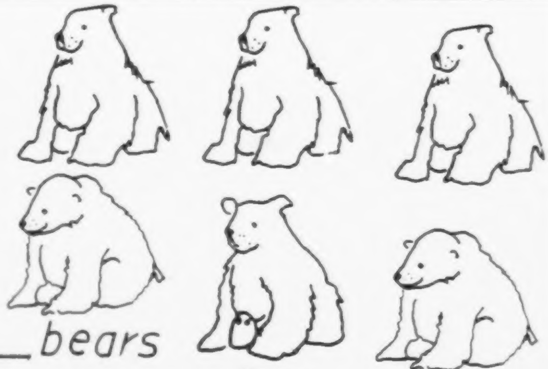
__ lions

__ groups of 2



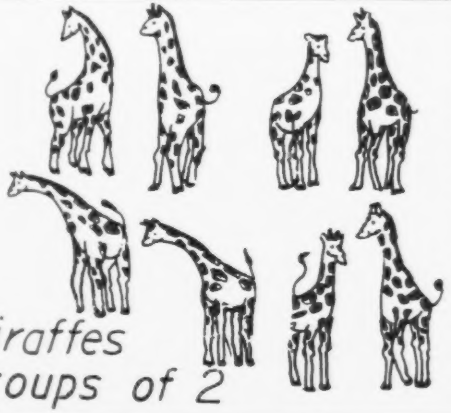
__ elephants

__ group of 2



__ bears

__ groups of 2



__ giraffes

__ groups of 2

DO YOU REMEMBER?

Write the numbers that come one before and one after each number below.

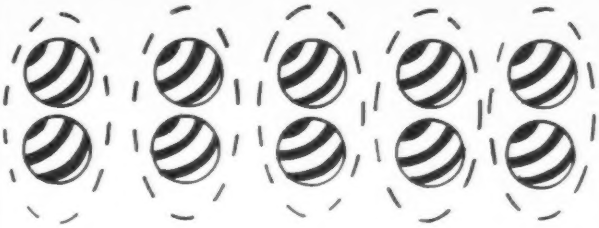
___,355,___ ___,738,___ ___,572,___

P.O. 2.05.02.03

NAME:________________________ CLASS:__________ DATE:________

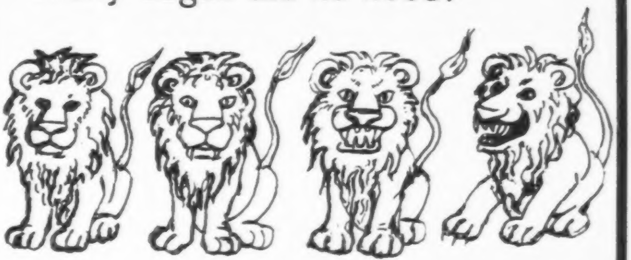
Circle groups of two. Answer each question.

1. There are 10 balls. I want to put 2 balls in each box. How many boxes do I need?



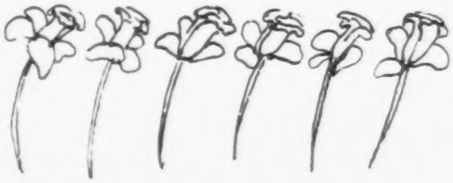
5 boxes

2. There are 4 lions. The zookeeper put 2 lions in each cage. How many cages did he need?



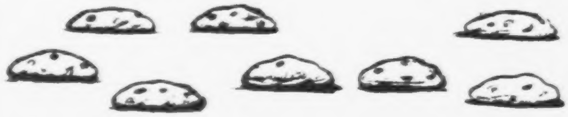
☐ cages

3. Maria has 6 flowers. She put 2 flowers in each vase. How many vases did she need?



☐ vases

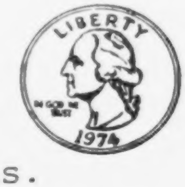
4. Mrs. Jones has 8 chocolate chip cookies. She put 2 cookies on each plate. How many plates did she need?

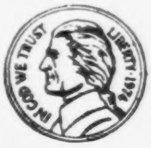


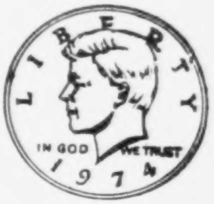
☐ plates

DO YOU REMEMBER?

Carl has 1 coin.
It is worth 3 dimes and
4 nickels.
Draw an X on the coin Carl has.


LIBERTY
IN GOD WE TRUST
1974


IN GOD WE TRUST
LIBERTY 1974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IN GOD WE TRUST
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2.10.07 LINEAR MEASUREMENT - METER, DECIMETER, AND CENTIMETER

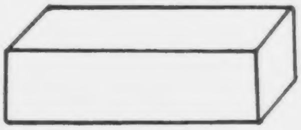
(1 lesson)

PERFORMANCE OBJECTIVES

The student will be able to...

2.10.07.01A measure objects using a meter stick and its subdivisions (cm/dm);

e.g.,



How many centimeters long is the box?

2.10.07.02B recognize that 100 cm = 1 m;

e.g.,

Measure a part of the chalkboard ledge. Count the markings on a meter stick.

2.10.07.03B compare centimeters, decimeters, and meters using equivalent measures;

e.g.,

100 centimeters = 1 meter
10 decimeters = 1 meter

2.10.07.04A solve story problems related to skills learned in this module.

e.g.,

Sara's plant was 5 cm tall in April. In May it was 12 cm tall. How many centimeters did the plant grow?

2.10.07

VOCABULARY	SYMBOLS
meter	m
centimeter	cm
decimeter	dm

GETTING STARTED

Prepare and distribute sticks of various lengths. Ask students to measure their math book, pencil and notebook and record the lengths using the terms longer than, shorter than or about the same length as a specific number of sticks. Say, "Why did everyone get different results?" (Different units result in different measurements.)

Distribute sticks of the same length. Ask the students to measure the same objects as above and record their answers. Say, "Why did we all get the same results?" (The unit of measure is the same or standard.)

Prepare and display 3 pieces of string, each of the following lengths: a centimeter, a decimeter, and a meter. Label each piece of string with the appropriate metric unit. Prepare a variety of objects, varying in length, e.g., pencil, paper clips, crayon, book, desk... Say, "Which metric unit, centimeter, decimeter or meter, would you use to measure the pencil?" (The decimeter is the best choice to measure the pencil.) Ask a student to use the decimeter string to measure the pencil.

Repeat this procedure using the other objects. Elicit that the smallest items are measured in centimeters, the middle sized items in decimeters, and the largest items in meters.

2.10.07

2.10.07.01 **measure objects using a meter stick and its subdivisions (cm/dm)**

STRATEGY 1: Display a meter stick. Tape it vertically next to or under the chalkboard ledge with the zero on the floor and the 100 cm (1 m) mark near the ledge of the chalkboard. Ask a student to stand in front of the meter stick. Say, "Is this student taller or shorter than one meter? (Most second grade students will be taller.) Many second grade students are between one and two meters tall. How can you use a one-meter stick to measure your height if you are taller than one meter?" Elicit that only one meter stick is necessary. The point at which the meter stick ends may be marked and the same meter stick placed at that end to complete the measurement by counting off the remaining centimeters and/or decimeters. Demonstrate by measuring students of various heights and recording the measurements on a chart.

e.g.,

Students' Heights

	Meters +	Decimeters +	Centimeters
Pablo	1	1	5
Maria	1	1	0
Kevin	1	2	3

STRATEGY 2: Prepare and distribute scissors and glue. The students will use worksheet 46a to prepare individual meter sticks. Display a completed model. Say, "A meter stick measures meters, (display the meter stick) decimeters, (point to the shaded and unshaded areas) and centimeters." (Point to the centimeter markings). Say, "Which unit would we use to measure the length of the

STRATEGY 2: cont'd

classroom?...the size of a coin?...the height of a chair? Explain." Display a chart to be completed by the students as various items are measured with the meter stick and say, "Which metric unit would you use to measure each item listed on the chart?" e.g.,

	Meter	Decimeter	Centimeter
Length of the classroom	✓		
Size of a coin			✓
Height of a chair		✓	

2.10.07.02 **recognize that 100 cm equals 1 m**

STRATEGY 1: Distribute ten 1-centimeter rods to each student or group of students. Say, "Place your 1-centimeter rods side by side. You can use the ten 1-centimeter rods, to measure objects which are short. Since each rod is only one centimeter long, each length of ten rods is ten centimeters or a decimeter. How could you measure longer objects?" (Place several groups of ten 1-centimeter rods together.) Ask ten students to join all their rods. Say, "Let's count the number of rods that are joined." Start counting by ones. Then stop and say, "If there are groups of ten, let's count by ten. Ten, twenty ...one-hundred. One hundred centimeters equal one meter." Place a meter stick alongside the one-hundred centimeter rods and compare. Say, "Each meter has one-hundred rods or one-hundred centimeters."

STRATEGY 2: Prepare ten 10 centimeter oak tag rulers. Display a meter stick. Say, "We can measure objects in

STRATEGY 2: cont'd

meters or in centimeters. What objects would you measure with a meter stick? (large objects) What objects would you measure with a centimeter ruler? (small objects) If you want to measure an object in meters, could you use a centimeter ruler?" (Yes, but it would take longer to measure.)

Draw a one meter line on the chalkboard. Say, "This line is one meter long. Let's see how many centimeters long it is. Let's use the centimeter rulers to measure the line" Ask ten students to tape their centimeter rulers side by side under the meter line. Say, "How many centimeter rulers did you use? (10) How many centimeters are there in all? (100) How many meters? (1) One hundred centimeters equal one meter."

Draw several lines on the chalkboard. Ask various students to measure each line using the meter stick or centimeter ruler and write the measurement next to the line.

2.10.07.03 **compare centimeters, decimeters and meters using equivalent measures**

STRATEGY 1: Separate the students into several groups. Prepare and distribute a meter stick, adding machine tape, cardboard decimeter strips, and ten 1 centimeter cubes to each group. Say, "We will use the meter stick, the decimeter strips, and the centimeter cubes to compare meters, decimeters and centimeters".

Ask a student in each group to use the meter stick to measure and cut a length of adding machine tape,

STRATEGY 1: cont'd

one meter in length. Ask a second student in each group to color the adding machine tape red while another student colors the cardboard strips green. Say, "How many green decimeter strips are equal to the red meter strip?" (Ten green decimeter strips are equal to one red meter strip.) Ask another student in the group to determine how many centimeter cubes are needed to equal a green decimeter strip in length. (10 cm = 1dm or 10 cubes = 1 green strip)

Record the students' findings on the chalkboard.

e.g.,

10 centimeters = 1 decimeter
10 decimeters = 1 meter

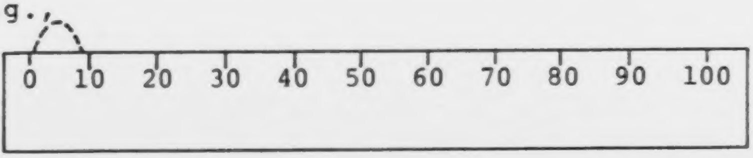
STRATEGY 2: Ask a student to use a meter stick to draw a line on the chalkboard one meter long. Ask other students to each show ten 1-centimeter markings on the line. Say, "How many centimeters are there in one meter? (100) Write, 100 cm = 1 m on the chalkboard. Ask a student to draw a line on the chalkboard that is 1 cm long. Point to the decimeter markings on the meter stick and say, "These are decimeters. Count by ten to see how many decimeters equal one meter." (10) Write 10 dm = 1 m on the chalkboard. Ask a student to draw a line on the chalkboard that is 1 dm long. Use the meter stick to compare meters, centimeters and decimeters, e.g., How many centimeters are in five decimeters? (50) How many decimeters are in 80 centimeters? (8)

2.10.07

2.10.07.04 **solve story problems related to skills learned in this module**

STRATEGY 1: Tape an oak tag meter stick to the chalkboard. Say, "Freddie the Frog loved to hop around Frogville. One day Freddie wanted to see his friend Sam. He hopped around town looking for him. He started at zero cm and landed on 10 cm.

e.g.,



He could not find Sam, so he took another hop and landed on 20 cm. Still no Sam. He hopped some more until be finally found Sam at 50 cm. How many centimeters in all did Freddie hop that day? (50 cm). Did he hop more than or less than one meter? (He hopped less than one meter.) How can you tell?" Repeat this procedure with other Freddie the Frog stories.

STRATEGY 2: Prepare a meter stick. Say, "Tony and Jose were arguing. Each thought that his grasshopper could jump the farthest. The boys had a contest. They marked the starting point. Both grasshoppers jumped. Here are their marks."

e.g.,

Tony's grasshopper ______________________________
Jose's grasshopper ____________________

Say, "Guess how far the grasshoppers jumped. Then use the meterstick to measure the exact length of the jumps. Tony's grasshopper jumped __ cm. Jose's grasshopper jumped __ cm. Whose grasshopper won? (Tony's) How much farther did Tony's

STRATEGY 2: cont'd

grasshopper jump than Jose's?" (Tony's grasshopper jumped ___ cm farther than Jose's.)

Repeat this procedure using other story problems.

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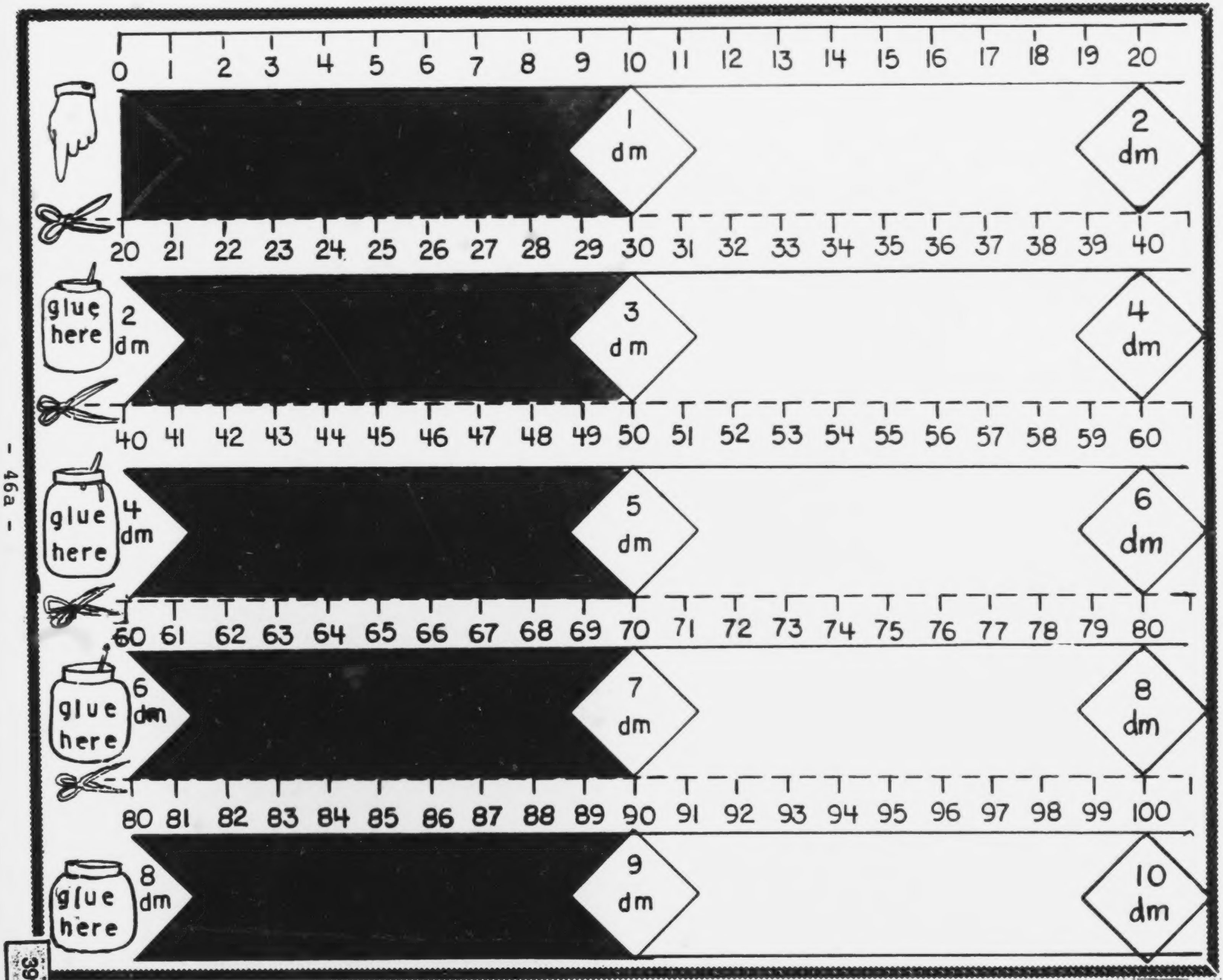
P.O. 2.10.07.01

NAME: ______________________ CLASS: ________ DATE: ________

Cut each strip along the dotted line. Glue the strips together to make a meter stick.


0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
1 dm
2 dm
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
glue here
2 dm
3 dm
4 dm
40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
glue here
4 dm
5 dm
6 dm
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
glue here
6 dm
7 dm
8 dm
80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
glue here
8 dm
9 dm
10 dm

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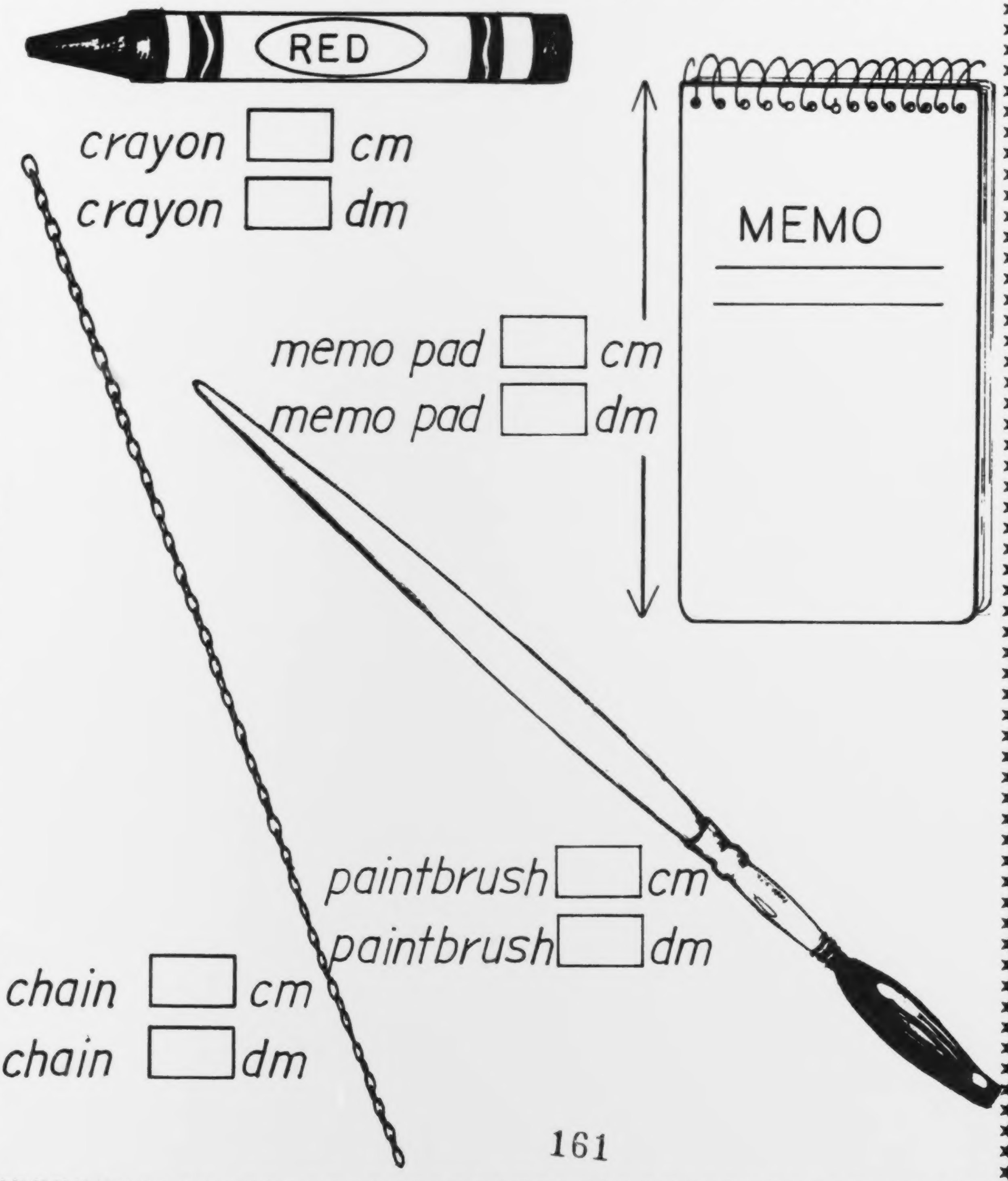
P.O. 2.10.07.03

NAME: ______________________ CLASS: ________ DATE: ________

Measure each item below in centimeters and decimeters.



crayon ☐ cm
crayon ☐ dm

memo pad ☐ cm
memo pad ☐ dm

paintbrush ☐ cm
paintbrush ☐ dm

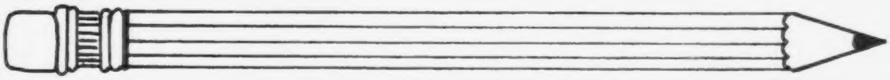
chain ☐ cm
chain ☐ dm

P.O. 2.10.07.04

NAME:______________________________ CLASS:________ DATE:________

Read and solve each problem. A centimeter ruler is needed for problems A and B.

A.

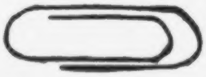


______ cm

______ cm

How much longer is the pencil than the eraser? ________ cm

B.



______ cm

______ cm

______ cm

What is the length of the three paper clips together? ________ cm

C.

The length of Tania's hair was 34 cm.
It grew 3 cm.
What is the length of Tania's hair now? ________ cm

D.

Juan is 15 dm tall.
Laura is 13 dm tall.
How much taller is Juan than Laura? ________ dm

DO YOU REMEMBER?

$\begin{array}{r} 11 \\ -5 \\ \hline \end{array}$ $\begin{array}{r} 14 \\ -8 \\ \hline \end{array}$ $\begin{array}{r} 17 \\ -9 \\ \hline \end{array}$ $\begin{array}{r} 15 \\ -8 \\ \hline \end{array}$ $\begin{array}{r} 12 \\ -6 \\ \hline \end{array}$ $\begin{array}{r} 13 \\ -9 \\ \hline \end{array}$

2.02.05 ADDITION OF 2-DIGIT NUMBERS WITH REGROUPING (EXCHANGE) ONES TO TENS

(3 lessons)

PERFORMANCE OBJECTIVES

The student will able to...

2.02.05.01B add two 2-digit numbers with regrouping (exchange) using expanded notation; e.g.,

$$\begin{array}{r} 26 \\ +\ 47 \\ \hline \end{array} \begin{array}{c} = \\ = \\ \\ \end{array} \begin{array}{rcr} 20 & + & 6 \\ +40 & + & 7 \\ \hline 60 & + & 13 \end{array} =$$

$$60 + \underbrace{10 + 3}_{13} =$$

$$\underbrace{60 + 10}_{70} + 3 =$$

$$70 + 3 =$$

$$73$$

2.02.05.02B add two 2-digit numbers with regrouping (exchange) ones to tens and check; e.g.,

$$\begin{array}{r} \overset{1}{4}6 \\ +27 \\ \hline 73 \end{array} \qquad \begin{array}{r} \underline{\text{check}} \\ \overset{1}{2}7 \\ +46 \\ \hline 73 \end{array}$$

2.02.05.03B solve story problems related to skills learned in this module. e.g.,

Mary had 26 marbles. Susan had 48 marbles. How many marbles did the girls have in all?

$$\begin{array}{r} \overset{1}{2}6 \\ +\ 48 \\ \hline 74 \end{array} \text{ marbles} \qquad \begin{array}{r} \underline{\text{check}} \\ \overset{1}{4}8 \\ +\ 26 \\ \hline 74 \end{array}$$

2.02.05

VOCABULARY

TERMS

regroup
expanded notation
digits

GETTING STARTED

Play a game called Land of Ten. Say, "In the Land of Ten only ten people can go into the Fun House at one time, no more, no less." Write the digits 8 and 5 on the chalkboard. Form a group of eight students and a group of five students. Say, "Can the group of eight go into the Fun House? (no) Why? (They need two more people to equal 10.) What shall we do?" Ask two students from the group of five to join the group of eight. Say, "How many are in this group now? (10) How many are in the other group? (3) How many students in all? (13) Is 8 + 5 equal to 10 + 3? (Yes) Why?"

Repeat this procedure with other numbers.

Prepare two boxes, one with bundles of ten sticks and the other with single sticks. Write 13 on the chalkboard. Ask a student to select tens and ones equal to 13. If 13 ones are selected say, "Is there another way to use the sticks to show 13?" Elicit that 13 ones is the same as one ten and 3 ones. If the student selects 1 ten and 3 ones say, "Is there another way to show 13?" (13 ones).

Repeat this procedure with other 2-digit numbers.

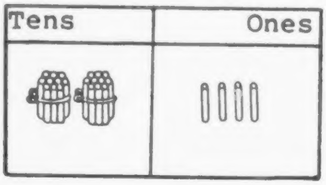
2.02.05

2.02.05.01 **add two 2-digit numbers with regrouping (exchange) using expanded notation**

STRATEGY 1: Prepare and distribute bundles of ten sticks, individual sticks, and place value mats to each student or group of students. Write $\begin{array}{r}24\\ \underline{+38}\end{array}$ on the chalkboard.

Say, "How many tens and ones are in 24?" (2 tens and 4 ones) Use your sticks to show 24 on your place value mat.

e.g.,



Repeat this procedure for 38.

Say, "What is the value of 2 tens? (20) ...4 ones?" (4) Write $\begin{array}{rl}24 & = 20 + 4\\ \underline{+38} & \end{array}$ on the chalkboard.

Repeat this procedure for 38 and write $\begin{array}{rcr}24 & = & 20 + 4\\ \underline{+38} & = & +\underline{30 + 8}\end{array}$ on the chalkboard.

Use the tens and the ones to demonstrate addition in expanded notation. Say, "Four plus eight equal twelve. How else can twelve ones be shown?" (1 ten plus 2 ones) Place a rubber band around 10 sticks. Say "Now we have another bundle of ten and 2 ones. Ten plus two equal twelve.

e.g.,

$$\begin{array}{rcrcl}
24 & = & 20 & + & 4\\
\underline{+38} & = & +30 & + & 8\\
\hline
 & = & 50 & + & 12 =\\
 & & 50 & + & 10 + 2
\end{array}$$

165

2.02.05

STRATEGY 1: cont'd

Say, "Combine your new bundle of ten sticks with the tens on your placemat. How many tens do you have now? (6) How many ones? (2) How many in all?" (62) Ask a student to rewrite the expanded form sum in standard form.

e.g.,

$$\begin{array}{rcrcrcrl} 24 & = & 20 & + & & & 4 & \\ \underline{+38} & = & +30 & + & & & 8 & \\ \cline{3-7} & = & 50 & + & & & 12 & = \end{array}$$

$$\underbrace{50 + 10}_{60} + 2 =$$

$$\underbrace{60 + 2}_{62} =$$

Repeat this procedure with other examples.

STRATEGY 2: Adapt Strategy 1, P.O 2.02.05.01, using squared material.

2.02.05.02 **add two 2-digit numbers with regrouping (exchange) ones to tens and check**

STRATEGY 1: Display several cards with a 2-digit number written on each.

e.g.,

$\boxed{26}$ $\boxed{37}$ $\boxed{55}$ $\boxed{28}$ $\boxed{36}$

Ask a student to choose two cards, e.g., 55 and 28. Say, "Imagine 55 books in one box and 28 books in the other box. How many books are there in all? How can we find out?" Write $\begin{array}{r} 55 \\ \underline{+28} \end{array}$ on the chalkboard. Say, "Which column do you add first? (the ones) What is the sum of 8 and 5? (13) Can you regroup 13 as tens and ones? (yes) How?" (Rewrite 13 as 1 ten and 3 ones.) The 3 is written in the ones place in the sum and the 1 is written as an addend in the tens place."

2.02.05

STRATEGY 1: cont'd

e.g.,

$$\begin{array}{r} 1 \\ 55 \\ +28 \\ \hline 3 \end{array}$$

Say, "How many tens do we now have? (8) Let's write the 8 in the tens place in the sum."

e.g.,

$$\begin{array}{rl} 1 & \\ 55 & \\ +28 & \\ \hline 83 & \text{books} \end{array}$$

Say, "How many books are there altogether? (There are 83 books altogether.) How can we check our answer?" (We can reverse the addends to check our answer.)

e.g.,

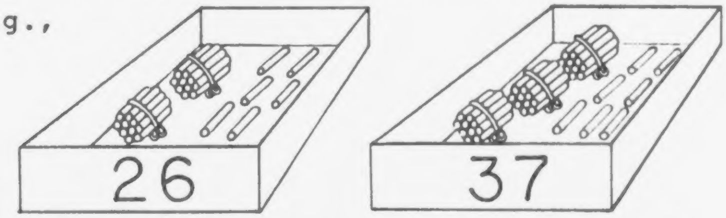
$$\begin{array}{rl} 1 & \\ 28 & \\ +55 & \\ \hline 83 & \text{books} \end{array}$$

Say, "Since 83 books is still the answer, it is probably correct."

Repeat this procedure using other pairs of cards.

STRATEGY 2: Prepare and display six boxes, each labeled with a different two-digit number. Place the corresponding number of counting objects inside the boxes

e.g.,



Draw a place value chart on the chalkboard.

e.g.,

Tens	Ones

167

STRATEGY 2: cont'd

Display the box numbered 26. Say, "How many tens and ones are in this box?" (2 tens and 6 ones) Ask a student to write 2 in the tens place and 6 in the ones place on the place value chart.

e.g.,

Tens	Ones
2	6

Repeat this procedure with another two-digit number, e.g., 37. (Select numbers for which regrouping is necessary.) Write $\begin{array}{r} 26 \\ +37 \\ \hline \end{array}$ on the chalkboard. Say, "In which column do we begin?" (ones) How much are 6 + 7? (13) Is that more than 10? (yes) Can we write 13, a 2-digit number, in the ones place? (no) If we bundle 13 sticks, how many tens are there? (1) How many ones? (3) Let's write the number 1 as an addend in the tens place."

e.g.,

$$\begin{array}{r} 1 \\ 26 \\ +37 \\ \hline 3 \end{array}$$

Say, "How many tens do we have now? (Write 6 in the sum) What is the answer?" (63)

e.g.,

$$\begin{array}{r} 1 \\ 26 \\ +37 \\ \hline 63 \end{array}$$

Check the example by using the commutative property for addition.

e.g.,

$$\begin{array}{r} 1 \\ 37 \\ +26 \\ \hline 63 \end{array}$$

Repeat this procedure using other examples.

2.02.05

2.02.05.03 **solve story problems related to skills learned in this module**

STRATEGY 1: Prepare three empty boxes and sets of tens and ones. Say, "There were 24 tigers in one cage and 28 lions in another. How many animals were there?" Display a box. Say, "This box will be the tiger's cage. We will place 24 sticks in the box. How shall we represent 24 tigers?" (2 bundles of ten sticks and 4 sticks) Display another box and say, "This is the lion's cage. We will place 28 sticks in the box. How shall we represent 28 lions? (2 bundles of ten sticks and 8 sticks) How can we find out how many animals there are all together? (We combine the sticks in both boxes and count them.) Is there another way to solve this problem?" (add) Write $\begin{array}{r}24\\+28\\\hline\end{array}$ on the chalkboard and elicit the procedure for adding and regrouping from the students.

e.g.,

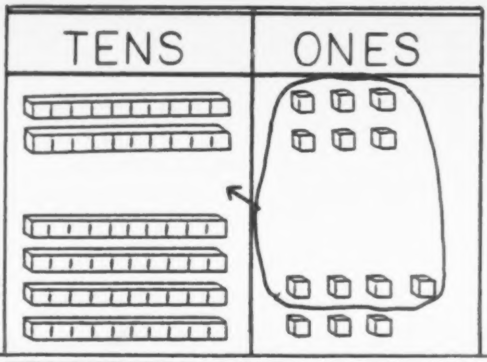
$$\begin{array}{r}1\\24\\+28\\\hline 52\end{array}\ \text{animals}$$

Strategy 2: Adapt strategy 1, P.O. 2.02.05.03, using squared materials.

P.O.2.02.05.01

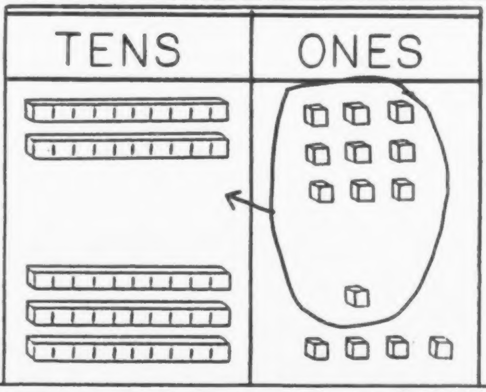
NAME: ____________________ CLASS: __________ DATE: ________

Solve each example using expanded notation.



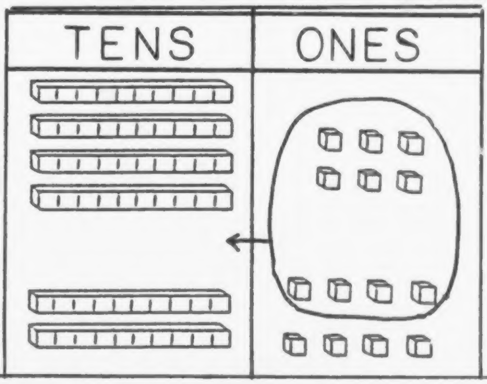
26 = 20+6
+47 = +40+7

60 + 13 =
60+10+3 =
70 + 3 =
73



29 = 20+9
+35 = +30+5

___ + ___ =
___ + ___ + ___ =
___ + ___ =
___



46 = 40+6
+28 = +20+8

___ + ___ =
___ + ___ + ___ =
___ + ___ =
___

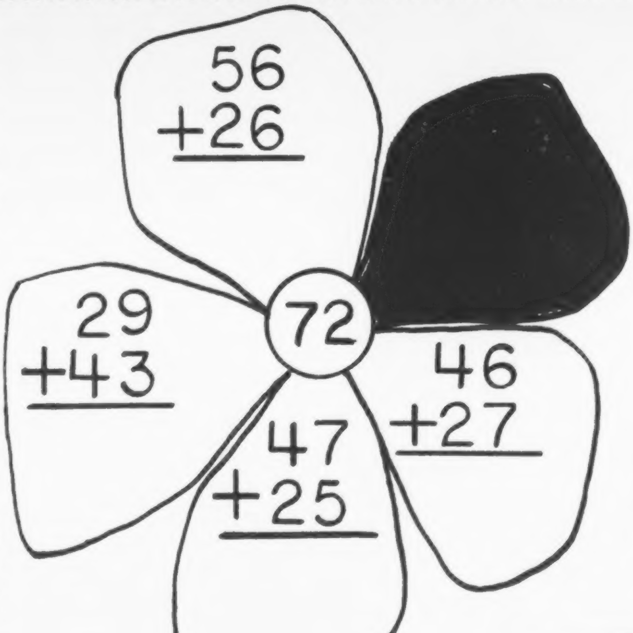
DO YOU REMEMBER ?

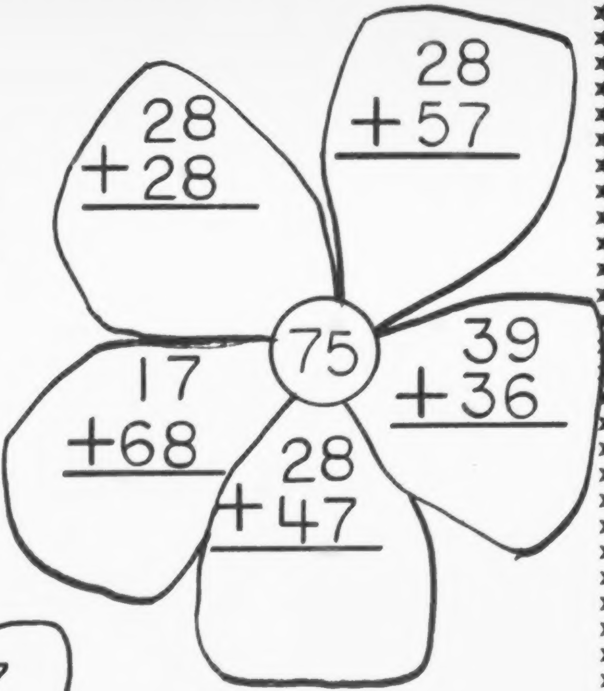
46	74	37	59	18	22	43
+ 5	+ 9	+ 8	+ 4	+ 6	+ 9	+ 7

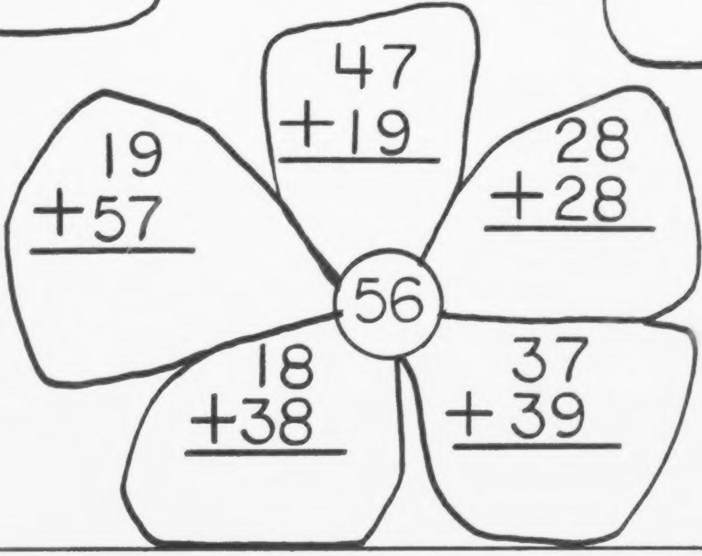
P.O. 2.02.05.02

NAME: ____________________ CLASS: ________ DATE: ________

Solve each example. Color the petals with answers equal to the number in the center of the flower.

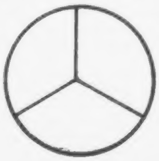

56
+26
72
29
+43
46
+27
47
+25

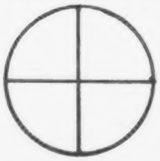

28
+57
28
+28
75
39
+36
17
+68
28
+47

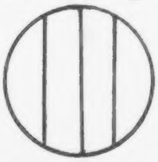

47
+19
19
+57
28
+28
56
18
+38
37
+39

DO YOU REMEMBER?

Draw a line under the circle that has been separated into fourths.







P.O. 2.02.05.03

NAME: ______________________ CLASS: ________ DATE: ________

Solve each problem and check. Write your answer in the blank space.

There were 36 boys and 27 girls at the circus. How many youngsters were at the circus?

______ youngsters

Solve

$$\begin{array}{r} 36 \\ +27 \\ \hline \end{array}$$

Check

$$\begin{array}{r} 27 \\ +36 \\ \hline \end{array}$$

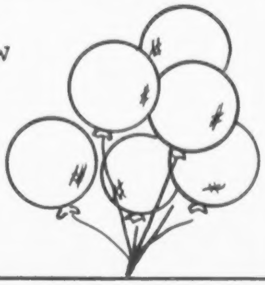
Ann saw 24 fat clowns and 17 thin clowns. How many clowns did she see in all?

______

Solve

Check

I counted 27 pink balloons and 37 purple balloons. How many balloons did I count?

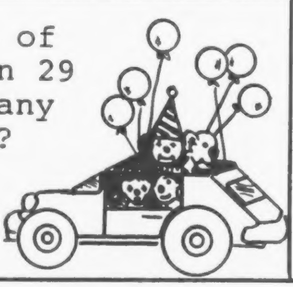


______

Solve

Check

Tony saw 17 people get out of the little circus car. Then 29 more people got out. How many people had been in the car?



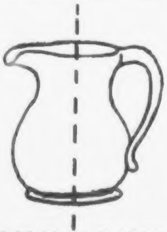
______

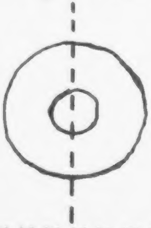
Solve

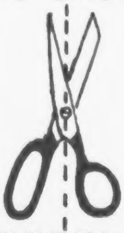
Check

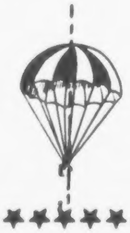
DO YOU REMEMBER?

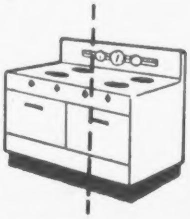
Circle the objects that show lines of symmetry.











2.03.05 SUBTRACTION OF 2-DIGIT NUMBERS WITH REGROUPING (EXCHANGE) TENS TO ONES

(2-3 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

2.03.05.01B subtract a 2-digit number from a 2-digit number with regrouping (exchange) using expanded notation;

e.g.,

$$\begin{array}{rcrcr} 42 & = & 40 + 2 & = & 30 + 12 \\ \underline{-26} & = & -\underline{(20 + 6)} & = & -\underline{(20 + \ \ 6)} \\ & & & & \underbrace{10 + 6}_{16} \ = \end{array}$$

2.03.05.02B subtract a 2-digit number from a 2-digit number with regrouping (exchange) tens to ones and check;

e.g.,

$$\begin{array}{r} \overset{3}{\cancel{4}}\overset{15}{\cancel{5}} \\ \underline{-\ 28} \\ 17 \end{array} \qquad \begin{array}{r} \underline{\text{check}} \\ 1 \\ 28 \\ \underline{+\ 17} \\ 45 \end{array}$$

2.03.05.03B subtract money through 99¢ and check;

e.g.,

$$\begin{array}{r} \overset{3}{\cancel{4}}\overset{13}{\cancel{3}}¢ \\ \underline{-\ 28¢} \\ 15¢ \end{array} \qquad \begin{array}{r} \underline{\text{check}} \\ 1 \\ 28¢ \\ \underline{+\ 15¢} \\ 43¢ \end{array}$$

2.03.05.04B solve story problems related to skills learned in this module.

e.g.,

Joel had 54 baseball cards.
He gave Bob 19 cards. How many
cards did Joel have left?

$$\begin{array}{rcr} & & \underline{\text{check}} \\ \overset{4}{\cancel{5}}\overset{14}{\cancel{4}} & & \overset{1}{1}9 \\ -\ 19 & & +\ 35 \\ \hline 35 \text{ cards} & & 54 \end{array}$$

VOCABULARY

TERMS

subtraction
difference
subtract
regroup
rename
exchange

GETTING STARTED

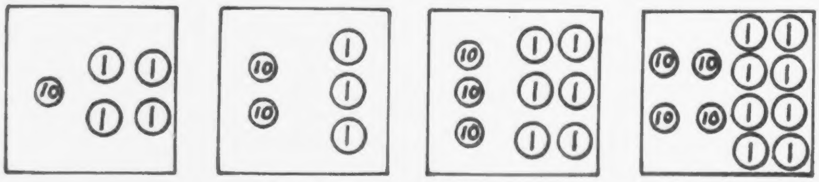
Prepare and display two empty plastic containers, one labeled TENS and the other labeled ONES. Distribute bundles of ten sticks and loose sticks to each student or group of students.

Place three bundles of ten in the TENS container and six ones in the ONES container. Say, "What number does this represent?" (36) Ask the students to use their sticks to show 36. Say, "We want to take 9 away from 36. How can we show this as a computation problem?" Elicit and write on the chalkboard, $\begin{array}{r} 36 \\ \underline{-\ 9} \end{array}$. "How can we take 9 away from 36 with the sticks we have when 9 ones cannot be taken from 6 ones?" (We can exchange a ten for ten ones.) Demonstrate by untying one bundle of ten and placing it in the ones pile to show 16. Say, "How many ones are there now? (16) If you take 9 ones away, now how many ones are left? (7) How many bundles of ten are left?" (2) Complete the example.

Repeat this procedure with other examples.

Prepare a set of coin cards using play money (pennies and dimes) and a set of coin value cards equal to each coin card.
e.g.,

coin cards



2.03.05

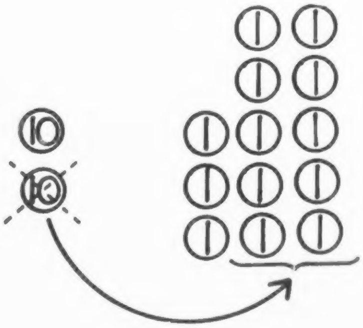
coin value cards 14¢ 23¢ 36¢ 48¢

Place only the coin value cards on the chalkboard. Place the coin cards on the chalk edge. Ask several students to match the coin cards to the coin value cards. Say, "Look at the cards representing twenty-three cents. If you have twenty-three cents and buy a pencil costing eight cents, how much money will you have left? How can we solve this problem? Who can write the subtraction example to solve this problem? ($\begin{array}{r}23\\ \underline{-8}\end{array}$) How can eight be subtracted from twenty-three when eight pennies cannot be taken from three pennies?" Ask a student to demonstrate the process of exchanging one ten for ten ones. Ask the students to then solve the example.

e.g.,

$$\begin{array}{r}\overset{1}{\cancel{2}}\overset{13}{\cancel{3}}¢\\ -8¢\\ \hline 15¢\end{array}$$

or

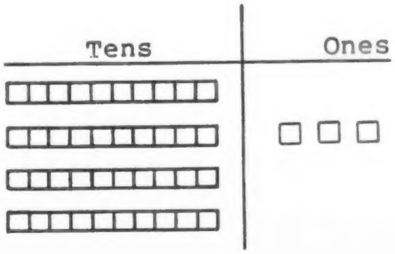


2.03.05

2.03.05.01 **subtract a 2-digit number from a 2-digit number with regrouping (exchange) using expanded notation**

STRATEGY 1: Prepare and distribute squared material (tens and ones) and a place value mat to each student or group of students. Display a model of 43 on the chalkboard.

e.g.,



Say, "Can you subtract 25 from 43? (Yes) Why?" (25 is less than 43.) Write $\begin{array}{r}43\\ \underline{-25}\end{array}$ on the chalkboard.

Ask a student to write 43 and 25 in expanded form on the chalkboard next to the example.

e.g.,

$$\begin{array}{rcr} 43 & = & 40 + 3 \\ \underline{-25} & = & -(\underline{20 + 5}) \end{array}$$

Say, "When we subtract using expanded notation we must put parentheses around the numerals in the subtrahand, the number we are subtracting. This way we know that the minus symbol goes with both parts of the expanded numeral." Place parentheses around 20 + 5

e.g.,

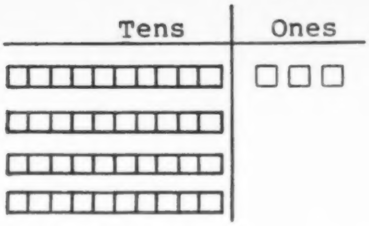
$$\begin{array}{r} 40 + 3 \\ \underline{-(20 + 5)} \end{array}$$

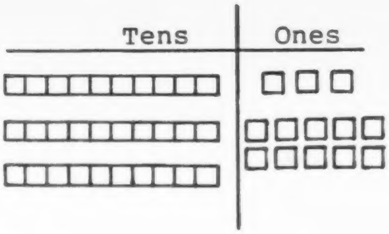
Say, "Let's use our squared material to solve this subtraction example. Can you subtract five ones from three ones?" (No, there are not enough ones.)

STRATEGY 1: cont'd

Use the squared material to demonstrate renaming one ten as ten ones. Rewrite the expanded number and subtract.

e.g.,





$$\begin{array}{r} 30 + 13 \\ -(20 + \ \ 5) \\ \hline \underbrace{10 + \ \ 8}_{18} = \end{array}$$

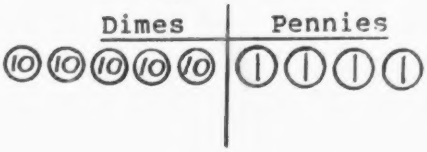
Repeat this procedure with other subtraction examples with regrouping using expanded notation to show regrouping.

Note: Students should be asked how to check their subtraction problems and should include the check with each example.

STRATEGY 2:

Prepare and distribute dimes and pennies and a dimes and pennies "placemat" to each student. Display a model for 54¢ on the chalkboard.

e.g.,



54¢ = 5 dimes 4 pennies = 50¢ + 4¢

Say, "Can you subtract 18¢ from 54¢?" (Yes, because 18¢ is less than 54¢) Write $\begin{array}{r} 54¢ \\ -\underline{18¢} \end{array}$ on the chalkboard. Say, "We can think of 18¢ as 1 dime and 8 pennies." Ask a student to rewrite the example in expanded form.

e.g.,

$$\begin{array}{rclcl} 54¢ & = & 5 \text{ dimes} \quad 4 \text{ pennies} & = & 50¢ + 4¢ \\ -\underline{18¢} & = & \underline{1 \text{ dime} \quad 8 \text{ pennies}} & = & \underline{10¢ + 8¢} \end{array}$$

Say, "Can you subtract 8¢ from 4¢?" (No, there are not enough pennies.) Demonstrate the process of

2.03.05

STRATEGY 2: cont'd

exchanging one dime (one ten) for ten pennies (ten ones) and rewrite the expanded number.

e.g.,

$$\begin{array}{rcr} 50 + 4 & = & 40 + 14 \\ \underline{-(10 + 8)} & = & \underline{-(10 + \ \ 8)} \end{array}$$

Ask a student to subtract at the chalkboard as the other students work at their desks.

$$\begin{array}{rcr} 40 & + & 14 \\ -(10 & + & 8) \\ \hline \end{array}$$
$$\underbrace{30 \quad + \quad 6}_{36} \ =$$

Repeat this procedure using other subtraction examples.

Note: Students should be asked how to check their subtraction problems and should include the check with each example.

2.03.05.02 **subtract a 2-digit number from a 2-digit number with regrouping (exchange) tens to ones and check**

STRATEGY 1: Prepare and distribute squared material and place value mats. Write several subtraction examples on the chalkboard.

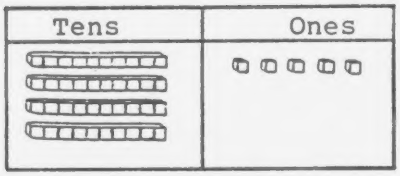
e.g.,

$$\text{a.}\ \begin{array}{r} 58 \\ \underline{-26} \end{array} \qquad \text{b.}\ \begin{array}{r} 27 \\ \underline{-14} \end{array} \qquad \text{c.}\ \begin{array}{r} 45 \\ \underline{-17} \end{array} \qquad \text{d.}\ \begin{array}{r} 69 \\ \underline{-23} \end{array} \qquad \text{e.}\ \begin{array}{r} 78 \\ \underline{-27} \end{array}$$

Say, "Which example needs regrouping?" (c) After the students explain why a., b., d., and e. do not need regrouping, erase these examples. Ask the students to write $\begin{array}{r} 45 \\ \underline{-17} \end{array}$ in their notebooks. Say, "I will model squared material for 45 as you arrange squared material showing 45 at your desks.

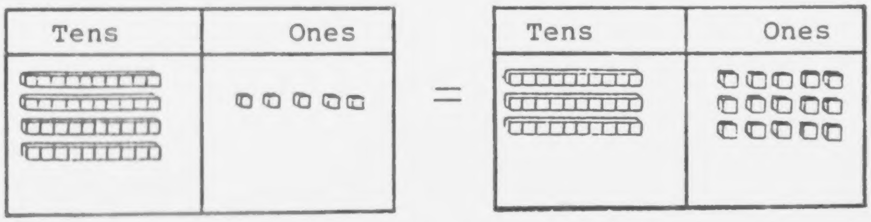
STRATEGY 1: cont'd

e.g.,



Say, "Can you subtract seven ones from five ones?" (no) Explain why you cannot." Ask the students to exchange one ten for ten ones on their placemats as you model it at the chalkboard.

e.g.,



Say, "There is a special way to show the exchange in the example. I will do the computation at the chalkboard as you do it in your notebooks."

e.g.,

$$\begin{array}{r} \overset{3}{\cancel{4}}\overset{15}{\cancel{5}} \\ -17 \\ \hline 28 \end{array}$$

Say, "Let's check the answer by adding the difference (28) to the subtrahend or the number subtracted. (17) The answer should be 45.

e.g.,

$$\begin{array}{r} \overset{3}{\cancel{4}}\overset{15}{\cancel{5}} \\ -17 \\ \hline 28 \end{array} \qquad \begin{array}{r} \underline{\text{check}} \\ 28 \\ +17 \\ \hline 45 \end{array}$$

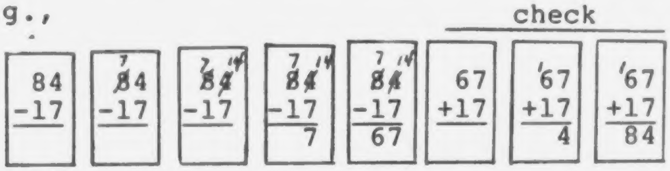
STRATEGY 2: Adapt Strategy 1, P.O. 2.03.05.02 using other materials such as sticks, colored rods or money.

Note: The following activity will provide a stimulating reinforcement for this performance objective.

STRATEGY 2: cont'd

Prepare sets of cards which show the step-by-step process of subtracting a 2-digit number from a 2-digit number with regrouping tens to ones and checking.

e.g.,



Divide the class into two teams (A and B) Ask a student from Team A and a student from Team B to arrange their sets of cards in the correct order. The first student to correctly arrange the cards scores a point for his/her team.

Repeat this procedure using other sets of cards. The first team to score 10 points wins.

2.03.05.03 **subtract money through 99¢ and check**

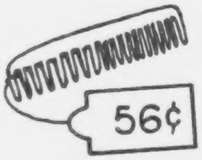
STRATEGY 1: Divide the class into groups of five. Distribute several dimes and pennies or play money to each group. Say, "Place three dimes and four pennies in the center of your desk. How much money is this?" (34¢) Write
34¢
-18¢ on the chalkboard. Say, "How can you subtract (take away) 18¢ from 34¢? (Exchange one dime for ten pennies.) How many pennies do you now have? (14) How many dimes are left? (2) Do the subtraction." Ask a student to complete the example on the chalkboard. Say, "How can we check our work to make sure it is correct?" (Add the amount left to what was subtracted.) Elicit other responses through examples such as saving money for an item, paying for the item and receiving change.

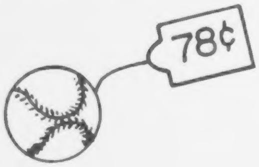
STRATEGY 1:
cont'd

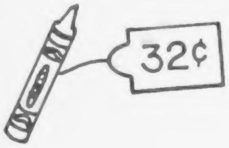
		check	
amount saved	$\overset{2}{\cancel{3}}\overset{14}{\cancel{4}}$¢	amount left	$\overset{1}{1}6$¢
amount spent	-18¢	amount spent	+18¢
amount left	16¢	amount saved	34¢

STRATEGY 2: Prepare and display several tagged items.

e.g.,







Prepare several cards, each with a subtraction example relating to the amount of money left after each item is purchased.

e.g.,

$$\boxed{\begin{array}{r} 94¢ \\ \underline{-78¢} \\ ¢ \end{array}} \qquad \boxed{\begin{array}{r} 63¢ \\ \underline{-56¢} \\ ¢ \end{array}} \qquad \boxed{\begin{array}{r} 77¢ \\ \underline{-56¢} \\ ¢ \end{array}}$$

Place the cards on a table, face down. Say, "Do not look at your card until I say, 'Go.' Each card shows how much money you started with and how much money you spent on an item. You will complete the card by finding the amount you have left and then labeling your card with the name of the item you 'purchased.' (Demonstrate) Use the blank side of the card to check your answer." (Place extra emphasis on examples with zero in the ones place.)

e.g.,

$$\begin{array}{cc} \text{Solve} & \text{Check} \\ \boxed{\begin{array}{rl} \overset{5}{\cancel{6}}\overset{13}{\cancel{3}}¢ & \\ \underline{-56¢} & \text{comb} \\ 7¢ & \end{array}} & \boxed{\begin{array}{r} \overset{1}{}7¢ \\ \underline{+56¢} \\ 63¢ \end{array}} \end{array}$$

The first student to complete the computation, label the card and check, is the winner.

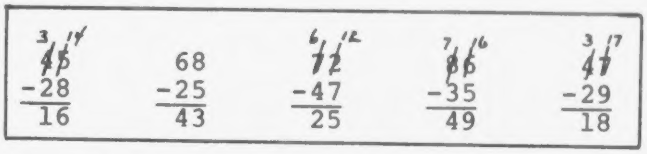
Choose two students at a time to select cards. Continue until each student has had a chance to participate.

2.03.05

2.03.05.04 **solve story problems related to skills learned in this module**

STRATEGY 1: Say, "Today you will be teachers. You will mark the paper of a student. Here is the student's paper." Display a facsimile of a student's paper on the chalkboard.

e.g.,

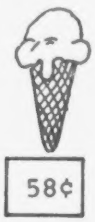


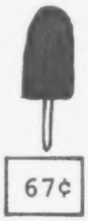
$$\begin{array}{r}\overset{3}{\cancel{4}}\overset{14}{\cancel{5}}\\ -28\\ \hline 16\end{array}\qquad\begin{array}{r}68\\ -25\\ \hline 43\end{array}\qquad\begin{array}{r}\overset{6}{\cancel{7}}\overset{12}{\cancel{2}}\\ -47\\ \hline 25\end{array}\qquad\begin{array}{r}\overset{7}{\cancel{8}}\overset{16}{\cancel{6}}\\ -35\\ \hline 49\end{array}\qquad\begin{array}{r}\overset{3}{\cancel{4}}\overset{17}{\cancel{7}}\\ -29\\ \hline 18\end{array}$$

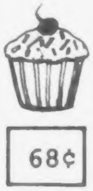
Say, "Look at each example carefully. Are they done correctly? (The first and fourth problems are incorrect.) Was it necessary to regroup? (Yes) For each incorrect example ask a student to redo the computation as the other students work at their desks. Say, "Remember, you are the teachers. You will now write a story problem for one of the subtraction examples on this student's paper." After the students' have written story problems, ask them to share the problems with one another and to determine the example with which they are associated.

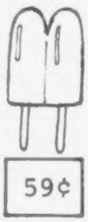
STRATEGY 2: Display pictures of ice cream treats and their prices at the chalkboard.

e.g.,









Say, "Here are ice-cream treats and their prices." Ask a student to come to the chalkboard. Say, "If I give you three quarters to spend how much money will

STRATEGY 2: cont'd

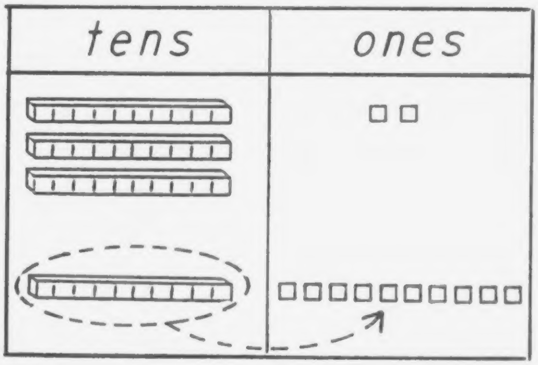
you have? (75¢) Which ice cream treat will you buy?" How much money will you have left?" Ask the student at the board to select a treat, write the computation problem needed to solve the problem, and do the computation as the rest of the class works at their desks. Ask another student to check the first student's work.

Repeat this procedure by asking other students to come to the chalkboard to spend part of the 75¢ on another ice cream treat.

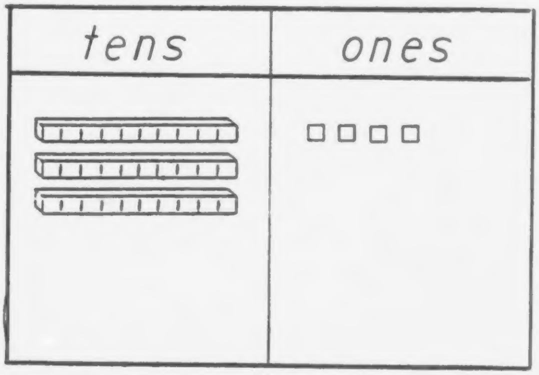
P.O. 2.03.05.01

NAME: ______________________ CLASS: ________ DATE: ________

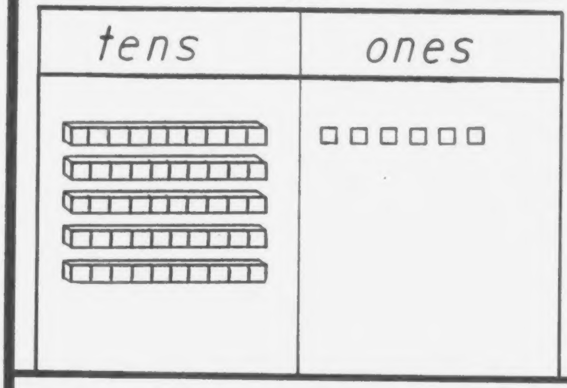
As you solve each example, regroup the squared material.



$$\begin{array}{r} 42 \\ -26 \\ \hline \end{array} = \begin{array}{r} 40+2 \\ -(20+6) \\ \hline \end{array} = \begin{array}{c} 30+12 \\ -(20+6) \\ \hline 10+6= \\ \vee \\ 16 \end{array}$$



$$\begin{array}{r} 34 \\ -18 \\ \hline \end{array} = \begin{array}{r} 30+4 \\ -(10+8) \\ \hline \end{array} = \begin{array}{c} 20+14 \\ -(10+8) \\ \hline \boxed{}+\boxed{}= \\ \vee \\ \boxed{} \end{array}$$



$$\begin{array}{r} 56 \\ -27 \\ \hline \end{array} = \begin{array}{r} 50+6 \\ -(20+7) \\ \hline \end{array} = \begin{array}{c} 40+16 \\ -(20+7) \\ \hline \boxed{}+\boxed{}= \\ \vee \\ \boxed{} \end{array}$$

DO YOU REMEMBER?

Favorite Pets

Pet	Students
dog	12
cat	7
bird	6

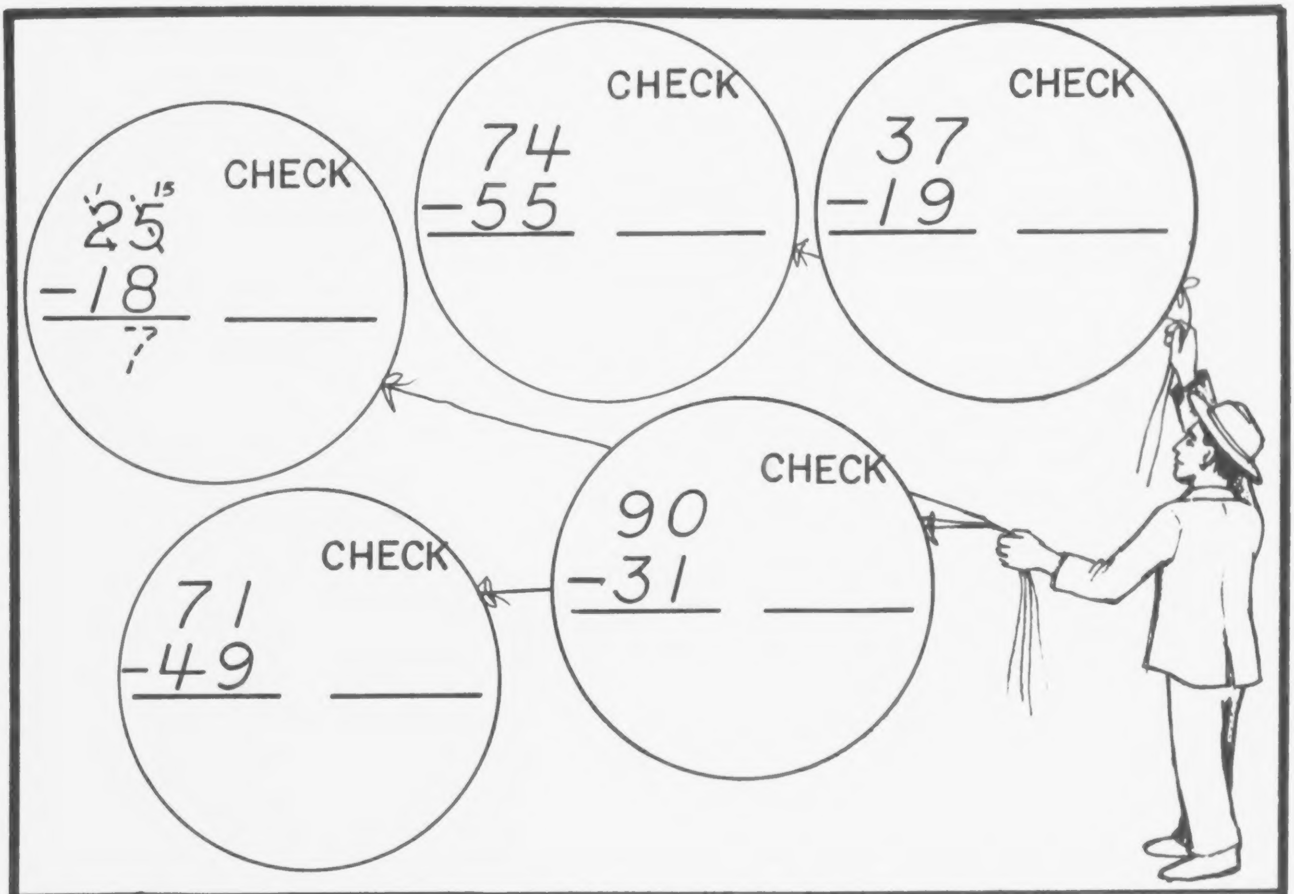
How many students like dogs? ____________

How many more students like cats than birds? ____________

P.O. 2.03.05.02

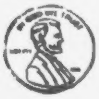
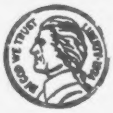
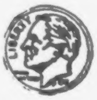
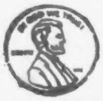
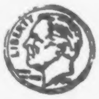
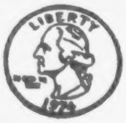
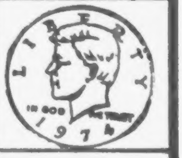
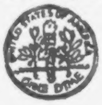
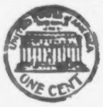
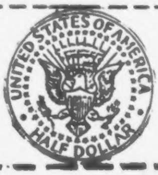
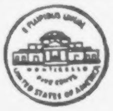
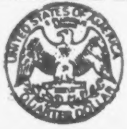
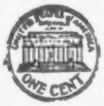
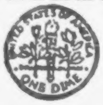
NAME: ______________________ CLASS: ________ DATE: ________

Solve and check each example.


CHECK
1 15
25
−18
7
CHECK
74
−55
CHECK
37
−19
CHECK
90
−31
CHECK
71
−49

DO YOU REMEMBER?

Cut along the dotted lines. Match the tails to the heads.

P.O. 2.03.05.03

NAME: ______________________ CLASS: ________ DATE: ________

Solve each problem. Check the answers.

Lorraine had 23¢
and spent 16¢.
She has ☐ left.

SOLVE CHECK

23¢ $\boxed{7}$¢
−16¢ +16¢
7¢ 23¢

Tommy had 45¢
and spent 27¢.
He has ☐ left.

SOLVE CHECK

− +

Robert had 96¢
and spent 37¢.
He has ☐ left.

SOLVE CHECK

Maria had 58¢
and spent 29¢.
She has ☐ left.

SOLVE CHECK

P.O. 2.03.05.04

NAME: ____________________ CLASS: ________ DATE: ______

Help the students solve the problems.
Check each answer.

Cathy had 75¢.
She spent 37¢.
How much money did she have left?

Solve

$$\begin{array}{r} \overset{6}{\cancel{7}}\overset{15}{\cancel{5}}\text{¢} \\ -37\text{¢} \\ \hline 38\text{¢ left} \end{array}$$

Check

$$\begin{array}{r} \overset{1}{3}8 \\ +37 \\ \hline 75 \end{array}$$

Jose bought 32 cupcakes for his birthday party. Each of 25 students ate a cupcake. How many cupcakes were left?

Solve Check

Louis had 43 baseball cards. He lost 17 cards. How many cards does Louis have left?

Solve Check

There are 26 students in Miriam's class. 18 are girls. How many are boys?

Solve Check

DO YOU REMEMBER?

3, 5, 8	
3+5=8	8-5=3
5+3=8	8-3=5

4, 3, 7	
	7-3=4

3, 2, 5	

7, 2, 9	
7+2=9	

6, 2, 8	
	8-6=2

1, 7, 8	

Unit 42

2.06.01 FRACTIONS - FIFTHS, SIXTHS, AND TENTHS

(2-3 lessons)

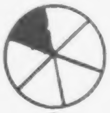
PERFORMANCE OBJECTIVES

The student will be able to...

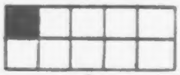
2.06.01.01A recognize that when an object is separated into parts of equal size, each part may be written as a unit fraction of the whole object;

e.g.,

$\frac{1}{5}$



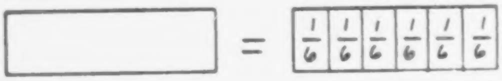
$\frac{1}{6}$



$\frac{1}{10}$

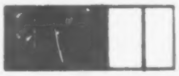
2.06.01.02A separate a concrete object into fifths, sixths, and tenths and identify the parts as equal;

e.g.,



2.06.01.03A identify and write fractional notation for fifths through $\frac{5}{5}$, sixths through $\frac{6}{6}$ and tenths through $\frac{10}{10}$;

e.g.,



shaded part = $\frac{3}{5}$

2.06.01.04A solve story problems related to skills learned in this module.

e.g.,

If a pie is to be shared equally by five students, what part will each student get?

Each student will get $\frac{1}{5}$ of the pie.

2.06.01

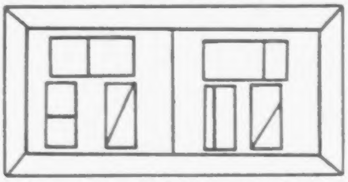
VOCABULARY

TERMS	SYMBOLS
one-fifth	$\frac{1}{5}$
one-sixth	$\frac{1}{6}$
one-tenth	$\frac{1}{10}$
value	

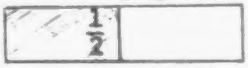
GETTING STARTED

Prepare rectangular sheets of paper. Fold several sheets into two equal parts and several sheets into two unequal parts. Ask a student to sort the sheets into two groups; those which have been divided equally and those which have been divided unequally. Ask other students to each select one rectangle. Say, "Tape the rectangles which are divided equally to the left side of the chalkboard and tape those which are divided unequally to the right side of the chalkboard."

e.g.,



Repeat this procedure using rectangles which have been divided into four parts, both equally and unequally.

Prepare crayons and paper. Distribute two sheets of paper and a crayon to each student. Say, "Fold one sheet of paper into two equal parts and color one of the parts." Write $\frac{1}{2}$ on the chalkboard. Say, "Which numeral in the fraction tells how many equal parts or equal pieces there are? (2, the bottom numeral) Which numeral tells how many of the equal parts or pieces you are talking about or have shaded? (1, the top numeral) What can we call the shaded part of the paper?" (We call the shaded part $\frac{1}{2}$.) Write on chalkboard 

What can we call the

GETTING STARTED
cont'd

unshaded part of the paper? (We call the unshaded part $\frac{1}{2}$.) Label each part of your paper $\frac{1}{2}$. Write the following on the chalkboard:

$$\begin{array}{l} 1 \longrightarrow \text{number of parts taken out of the object} \\ \overline{2} \longrightarrow \text{number of equal parts of the object} \end{array}$$

Say, "The bottom number of a fraction tells how many equal parts an object has. The top number of a fraction tells how many of these equal parts have been taken from the object."

Repeat this procedure using the second sheet of paper folded into four equal parts.

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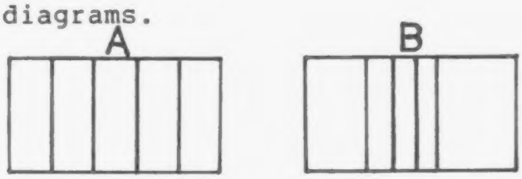
2.06.01

2.06.01.01 **recognize that when an object is separated into parts of equal size, each part may be written as a unit fraction of the whole object**

STRATEGY 1: Prepare 2 diagrams.
e.g.,



Say, "How many parts are in figure A?" (5) Ask a student to shade one part of figure A. Say, "How many parts are in figure B?" (5) Ask a student to shade one part of figure B. Say, "Does the shaded part of figure A show $\frac{1}{5}$? (yes) Why? (The figure is divided into 5 equal parts.) Does the shaded part of figure B show $\frac{1}{5}$? (no) Why not?" (The parts are not equal.)

Repeat this procedure for $\frac{1}{6}$ and $\frac{1}{10}$.

STRATEGY 2: Prepare and distribute to each student or group of students, yellow construction paper cut into fifths, blue construction paper cut into sixths, and red construction paper cut into tenths. Ask five students to each choose one piece of yellow paper and put the pieces together. Say, "Are the five pieces together equal in size to one whole piece of yellow construction paper? (yes) What can we call each student's piece? ($\frac{1}{5}$) Label each yellow piece of paper $\frac{1}{5}$." Demonstrate by writing $\frac{1}{5}$ on each piece of a model taped to the chalkboard.

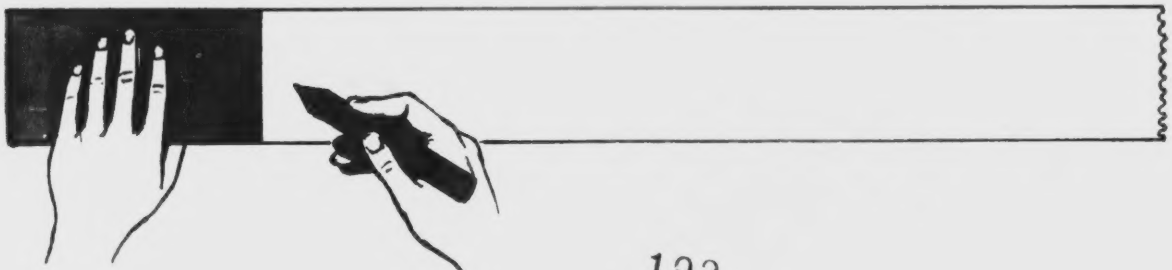
Repeat this procedure for sixths and tenths.

2.06.01.02 **separate a concrete object into fifths, sixths, and tenths and identify the parts as equal**

STRATEGY 1: Prepare and distribute scissors to each student or group of students. Using workbook page 50b, ask the students to cut out the four boxes along the heavy black lines. Say, "Find the box that has no dotted lines in it. This is one whole rectangle. Find the box that is separated into fifths with dotted lines. Place the whole rectangle on this box. Are they the same size? (yes) Now cut along the dotted lines. How many pieces do you have? (5) Are they equal in size? (yes) How do you know? (When the 5 parts are placed one on top of another we can see they are all the same size.) Place the 5 parts side by side on the whole rectangle. Do they form the same size rectangle? (yes) We have cut a rectangle into 5 equal parts. What shall we call each part? ($\frac{1}{5}$) Label each part $\frac{1}{5}$.

Repeat this procedure with sixths and tenths.

STRATEGY 2: Prepare a roll of adding machine tape and cardboard strips in the following lengths: 6 inches, 5 inches, 3 inches. Tape a strip of adding machine tape (30 inches in length) to the chalkboard. Ask a student to hold the 6-inch cardboard strip over the left 6-inches of the adding machine tape. Draw a line to designate 6 inches on the tape.
e.g.,



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STRATEGY 2: cont'd

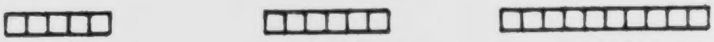
Repeat this procedure moving the cardboard strip until you have divided the strip of adding machine tape into five equal pieces.

Say, "Into how many parts did we divide the strip? (5) Are they equal? How can we show they are equal? (Fold at each line or cut at each line and match the pieces.) Label each piece $\frac{1}{5}$.
e.g.,

Repeat this procedure for separating a thirty-inch strip into sixths by using the 5-inch cardboard strip as a marker, and tenths by using the 3-inch cardboard strip.

2.06.01.03 **identify and write fractional notation for fifths through $\frac{5}{5}$, sixths through $\frac{6}{6}$ and tenths through $\frac{10}{10}$**

STRATEGY 1: Prepare a set of oaktag strips divided into fifths, sixths and tenths. Distribute them to the class so that each student or group of students has only one strip.
e.g.,

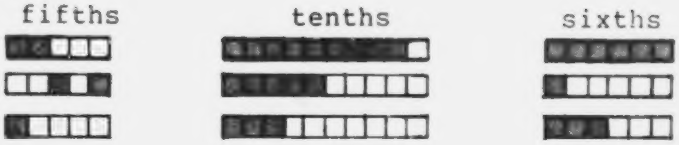


Say, "Use a crayon to color one or more parts of your strip."

Collect all the strips. Say, "Each strip has been divided into either five parts, ten parts or six parts. I will display each strip and you will say how it has been divided and place it in the correct pile. The piles are labeled fifths, tenths or sixths."

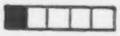
STRATEGY 1: cont'd

e.g.,



After all the strips have been sorted, ask a student to find the strip with only one part out of five colored and tape it to the chalkboard. Label it $\frac{1}{5}$ and say, "One fifth of this strip has been shaded. What part of the strip is not shaded? ($\frac{4}{5}$) Explain."

e.g.,



shaded part = $\frac{1}{5}$

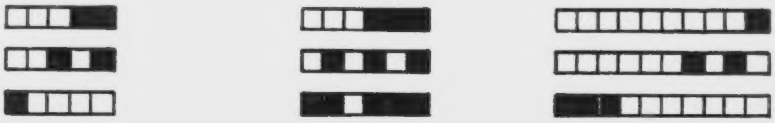
unshaded part = $\frac{4}{5}$

Continue this procedure through $\frac{5}{5}$, $\frac{10}{10}$ and $\frac{6}{6}$.

Note: Reinforce the meaning of the top number (numerator) and the bottom number (denominator).

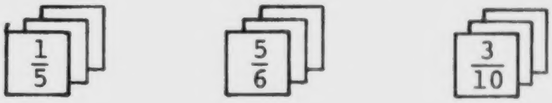
STRATEGY 2: Prepare strips divided into fifths, sixths, and tenths with some parts shaded on each.

e.g.,



Prepare numeral cards with fractional notations corresponding to the shaded parts of the strips. (Each numeral card should show the fractional strip, appropriately shaded, on the reverse side.)

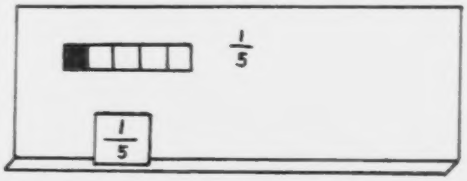
e.g.,



STRATEGY 2: cont'd

Tape a fractional strip to the chalkboard. Ask a student to select the numeral card that corresponds to the shaded parts of the strip and place it on the chalkboard ledge below the strip. Say, "Check to see if you have matched the numeral card with the fractional strip by looking at the back of the numeral card. Write the corresponding fraction next to the fractional strip."

e.g.,



Repeat this procedure until all the fractional strips and numeral cards have been matched.

Note: Use each fractional picture card to reinforce the students' understanding of the numerator and the denominator.

2.06.01.04 **solve story problems related to skills learned in this module**

STRATEGY 1: Prepare colored chalk. On the chalkboard draw a rope separated into five equal parts. Say, "Jack cut $\frac{3}{5}$ of this rope for his dog's leash." Ask a student to use colored chalk to trace the part that he used. Say, "Into how many parts is the rope separated? (5) How can you tell? Are all of the parts equal? (yes) What is each part called? ($\frac{1}{5}$) What fractional part of the rope was used? ($\frac{3}{5}$) What part was not used? ($\frac{2}{5}$) How can you decide this answer?"

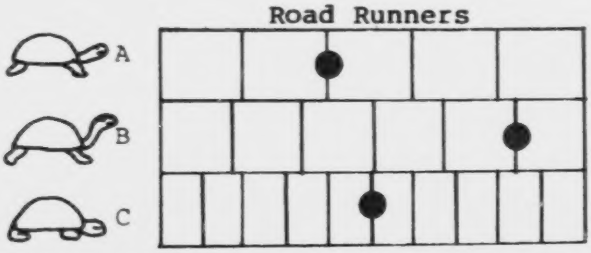
STRATEGY 1: cont'd

Repeat this procedure using word problems involving sixths and tenths.

Note: Use each fractional picture card to reinforce the students' understanding of the numerator and the denominator.

STRATEGY 2:

Draw the following chart on the chalkboard.
e.g.,



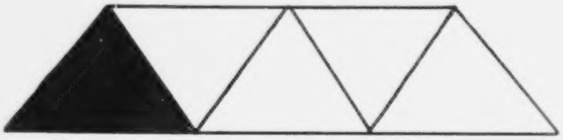
Say, "Three turtles are in the road race. How far must each turtle move to reach the dot in its lane?" Ask the students to count the fractional parts in each lane. Ask various students to shade each lane to the dot. Say, "Turtle A reached its dot. How much of the lane did Turtle A cover? $(\frac{2}{5})$ How did you decide this answer?"

Repeat this procedure for Turtles B and C and with other fractional parts by changing the location of the dot in each lane.

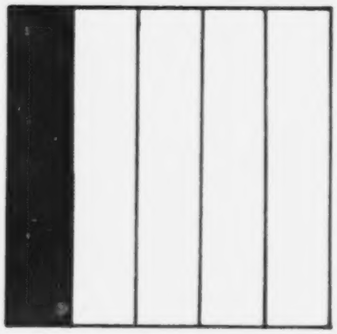
P.O. 2.06.01.01

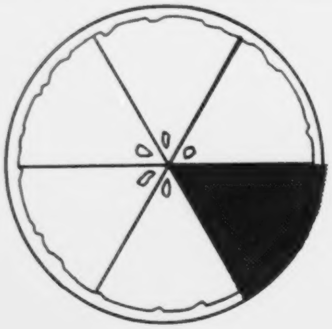
NAME: ____________________ CLASS: __________ DATE: __________

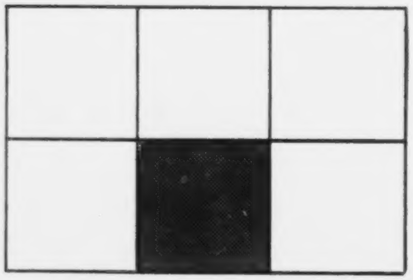
Write the fraction which names the shaded part.

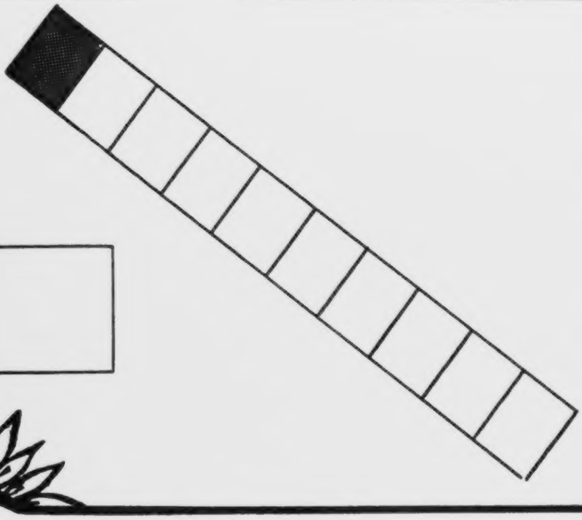


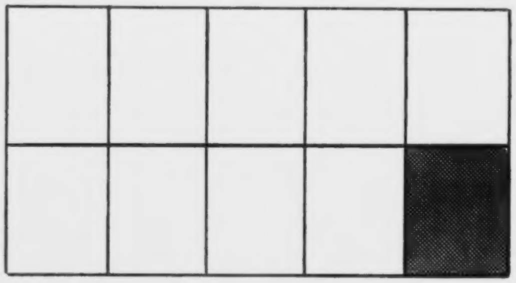
$\frac{1}{5}$







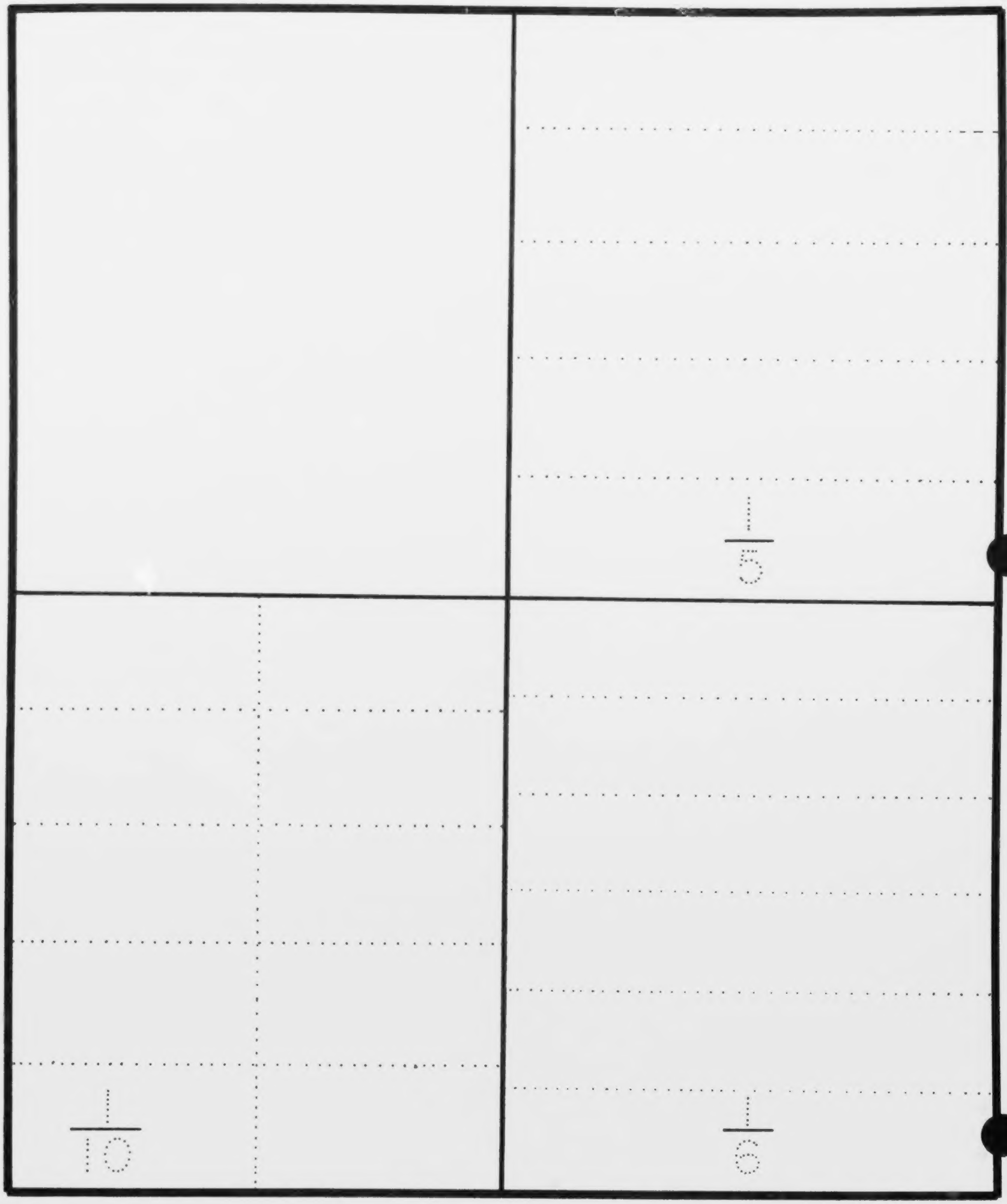




P.O. 2.06.01.02

NAME:____CLASS:_________DATE:_______

Cut out the four rectangles along the heavy, dark lines.
Then cut three rectangles into fractional parts along the dotted lines.


$\frac{1}{5}$
$\frac{1}{10}$
$\frac{1}{6}$

P.O. 2.06.01.03

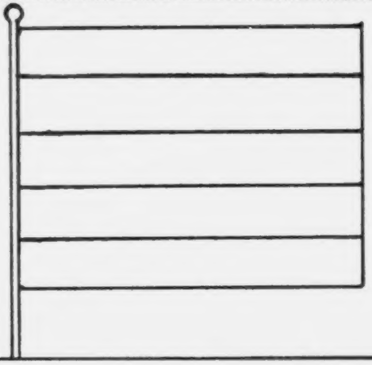
NAME:____ CLASS:__________ DATE:________

Read each problem. Answer the questions.

Color $\frac{2}{5}$ of the flag blue.

If $\frac{2}{5}$ of the flag is blue,

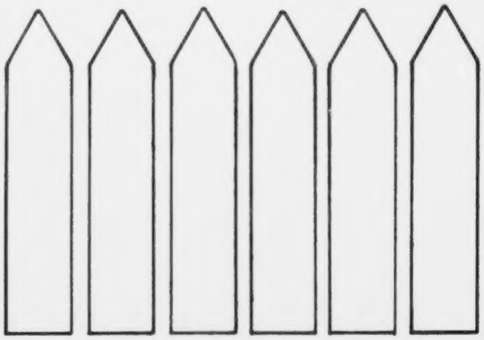
what part is not blue? $\boxed{\frac{3}{5}}$



Color $\frac{1}{6}$ of the fence red.

If $\frac{1}{6}$ of the fence is red,

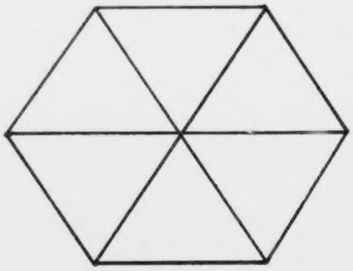
what part is not red? ☐



Color $\frac{2}{6}$ of the gameboard yellow.

If $\frac{2}{6}$ of the gameboard is yellow,

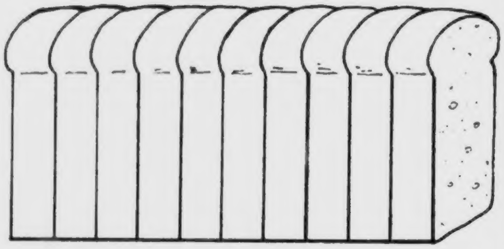
what part is not yellow? ☐



Color $\frac{7}{10}$ of the bread brown.

If $\frac{7}{10}$ of the bread is brown,

what part is not brown? ☐



P.O. 2.06.01.04

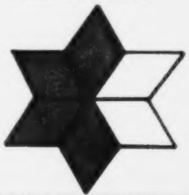
NAME: ______________________ CLASS: ________ DATE: ________

Solve each problem.

1. John made a design.

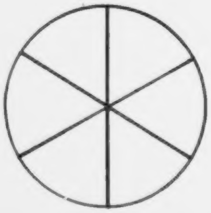
He shaded $\frac{4}{6}$ of the design.

What part of the design is not shaded?



$\frac{2}{5}$ not shaded

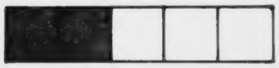
2. James cut a pizza into 6 equal parts. What is each part called?



3. Mary divided her granola bar into 5 equal parts.

She ate $\frac{2}{5}$ of it.

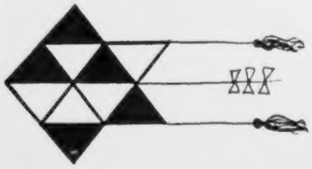
What part did she save?



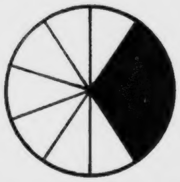
4. Jerry has a kite.

$\frac{5}{10}$ of the kite is black.

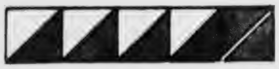
What part is not black?



5. A pie was cut into 10 equal pieces. If 3 pieces were eaten, what part of the pie was left?



6. Mrs. Johnson shaded $\frac{6}{10}$ of her design. What part is not shaded?



Unit 43

2.12.03 PROBABILITY - PREDICT AND TALLY OUTCOMES

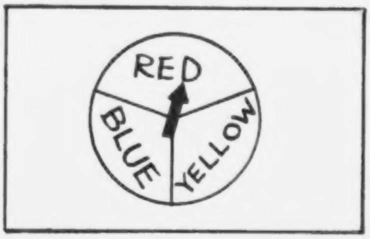
(1 lesson)

PERFORMANCE OBJECTIVES

The student will be able to...

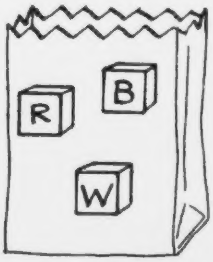
2.12.03.01B predict the outcome of three equally likely events;

e.g.,



2.12.03.02B tally the outcome in a three-possibility event.

Red	White	Blue
𝍸	///	/



Make a tally mark in the appropriate column. Count or tally the marks.

2.12.03

VOCABULARY

TERMS

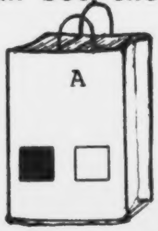
predict
outcome
tally

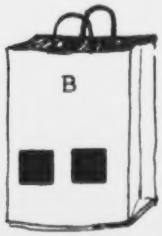
GETTING STARTED

Give each student a penny. Say, "Look at the side with the picture of a head. We call this side heads. Look at the other side of the coin. We call this side tails. If you flip this coin, on what side do you think it will land? Can you be certain? Flip your coins. On which side did your coin land?" Count the number of coins which landed on heads and the number of coins which landed on tails.

Prepare and display two bags, each with two cubes. Draw pictures of the bags' contents on the outside of each bag so that students at their desks can see them.

e.g.,





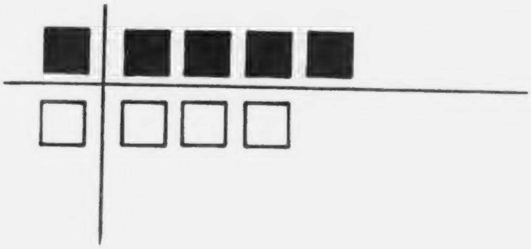
Say, "If I ask you to reach into bag B can you be certain (sure) about which color cube you will pick" Ask a student to pick a cube from bag B, note the color, and return it to the bag. Repeat this several times. Say, "Can you predict and be certain (sure) about what color you will pick each time? (Yes) Why? (Both cubes are black.) If I ask you to reach into bag A can you be certain (sure) about which color cube you will draw?" (No because there are two different colors.) Ask a student to reach into bag A, pick a cube, note its color, and return it to the bag. Repeat this several times. Say, "Can you predict and be certain (sure) about

2.12.03

GETTING STARTED
cont'd

the color you will pick each time? (No) Why?" Draw a chart on the chalkboard and record the results of the draws as the students pick from bag A.

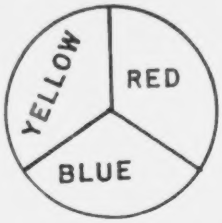
e.g.,



2.12.03

2.12.03.01 **predict the outcome of three equally likely events**

STRATEGY 1: Prepare and display a spinner with three equal parts; one yellow, one red, and one blue. e.g.,



Say "How many parts or colors are on the spinner? (3) What are the colors on the spinner? When you spin the pointer, is it possible to land on green? (no) orange? (no) Explain. On which colors is it possible to land? (red, yellow, blue) Say, "Are all the sections equal in size?" (Yes) There is one yellow section out of the three equal sections. The chance of the pointer landing on yellow is one out of three. What chance does the pointer have to land on blue? (It has one out of three chances to land on blue.)...red?" (It has one out of three chances to land on red.)

STRATEGY 2: Prepare and display a paper bag, a red cube, a blue cube, and a yellow cube. Place the cubes inside the bag. Say, "If I put my hand in the bag, which color cube might I pick? (red, yellow, or blue). How many choices are possible? (3) One of the three cubes is red, so I have one out of three chances to pick the red cube. What chance do I have of picking the blue cube? (One out of three.) How do you know? (One of the three cubes is blue). What is the chance of picking the yellow cube? (One out of three.) Why? (One out of the three cubes is yellow.)

2.12.03

STRATEGY 2: cont'd

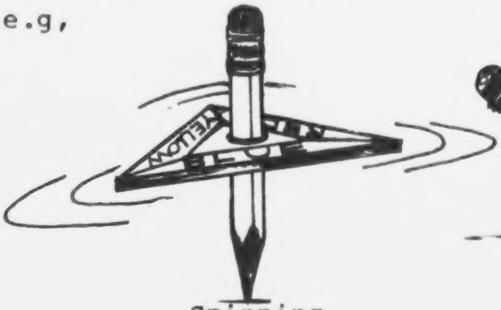
Repeat this procedure with 3 different color chips, 3 different crayons of the same size, and 3 different playing cards.

2.12.03.02 tally the outcome in a three possibility event

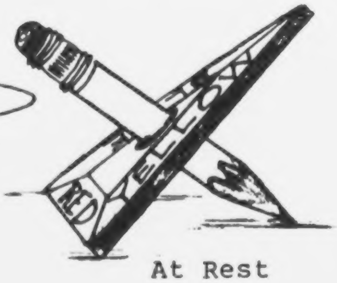
STRATEGY 1:

Prepare cardboard triangles measuring 10cm on each side. Make a small hole in the center of each triangle. Distribute one triangle to each student or group of students. Ask the students to color one side of the triangle red, another yellow, and the third side blue. Demonstrate how to place a small pencil through the center so that you have a spinner with three possible outcomes.

e.g,



Spinning



At Rest

Say, "We are going to use the spinner in a game." Demonstrate how the spinner comes to rest on one of its sides (colors). Say, "What is the chance of the spinner landing on red? (one out of three) ...blue? (one out of three)...yellow?" (one out of three).

Ask a student to record each spin on a chart by tallying each outcome.

e.g.,

Red	𝍷𝍷𝍷
Yellow	𝍸
Blue	𝍷𝍷𝍷𝍷

STRATEGY 1: cont'd

Demonstrate how to record each spin with a tally mark and how the fifth tally mark crosses the first four. Say, "This makes counting the total number of marks easier."

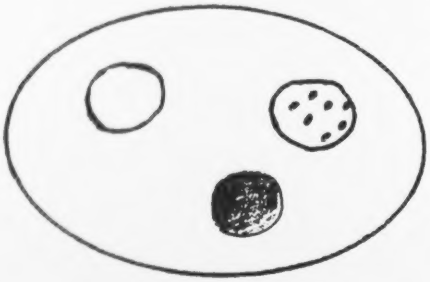
Continue this procedure until the outcome of each student's spin has been recorded. Compare the results for each color.

P.O. 2.12.03.01

NAME: ________________________ CLASS: ________ DATE: ________

Read the story and answer the questions.

Mother baked cookies.
1 vanilla, 1 chocolate, and
1 chocolate chip were left
on the plate.



Close your eyes and pretend to choose a cookie.

1. What are your chances of choosing the vanilla cookie?

   _____ out of _____

2. What are your chances of choosing the chocolate cookie?

   _____ out of _____

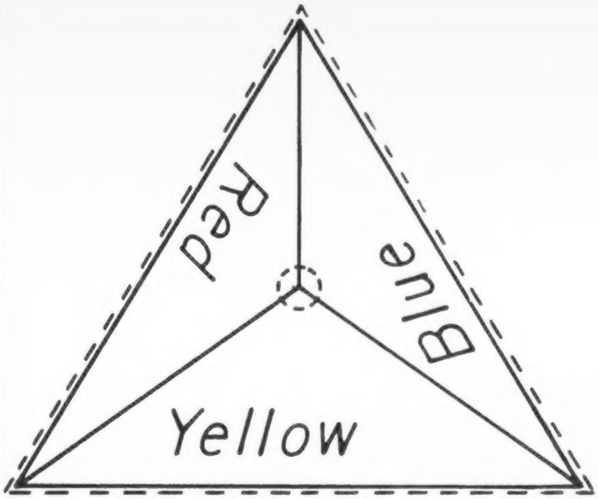
3. What are your chances of choosing the chocolate chip cookie?

   _____ out of _____

P.O. 2.12.03.02

NAME:______________________________ CLASS:________ DATE:________

Follow the directions below.



HOW TO MAKE A SPINNER

1. Color each section of the triangle.
2. Cut out the triangle along the dotted lines.
3. Paste the triangle to a piece of cardboard the same size.
4. Place a pencil through the dot in the center of the triangle.

Red	Yellow	Blue

TALLYING THE OUTCOMES

1. Spin the spinner.
2. On which color did it land? ________________
3. Place a tally mark on the chart under the color on which it landed.
4. Spin the spinner 14 more times and tally the outcomes on the chart.
5. Which color did you spin most often? ________________
6. Which color did you spin least often? ________________
7. Compare your results with those of another student.

2.10.08 WEIGHT - OUNCE, POUND

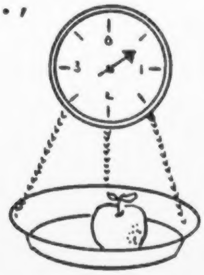
(2-3 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

2.10.08.01A identify pounds and ounces as standard units of weight;

e.g.,



How many ounces does a piece of fruit weigh?

*2.10.08.02A estimate and weigh familiar objects using appropriate customary units.

e.g.,

Object	Estimate	Actual
book	1 lb.	2 lbs.

2.10.08

VOCABULARY

TERMS	SYMBOLS
ounce	oz.
pound	lb.
weight	

GETTING STARTED

Prepare and display a thermometer, a measuring cup, and measuring spoons. Say, "When we want to find out how hot or cold something is, what do we use?" (A thermometer is used to measure the temperature.) Say, "Let's make believe that we will bake a cake. What do we need? (milk, eggs...) Before we put all of these things together what must we do?" (We must measure everything.) It may be helpful to show the students a cake mix box. Display the measuring cup and spoons and say, "We can use the measuring cup to measure a cup of milk and the measuring spoons to measure a teaspoon of sugar. The thermometer, cup and spoons are all measurement tools." Can you think of other measurement tools? (ruler, meter stick, etc.) What are these tools used to measure?"

Prepare six paper bags with cotton, a sponge, and tissues in three bags and rocks, crayons and beans in three bags. Mark the bags containing the cotton, sponge and tissues 'A'. Mark the bags containing the rocks, crayons, and beans 'B'. Pair off the bags, e.g., AB, AB, AB. Say, "We will perform an experiment. These six brown bags look alike. You will guess which is the heavier bag in each pair. You may feel the bags but you may not lift them." Chart the results of their guesses. Then ask several students to lift two bags at a time to determine which bag feels heavier. Compare the touching with the lifting guesses.

2.10.08

2.10.08.01 **identify pounds and ounces as standard units of weight**

STRATEGY 1: Prepare and display a scale that shows pounds and ounces, objects weighing at least one pound, and objects weighing less than one pound. Say, "Have you ever gone shopping in a supermarket? What did you buy? If you bought apples how many did you buy? How did the grocer measure the weight of the apples? (He placed them on a scale.) What items can be measured in pounds? (meat, fruit, cheese.) Sometimes I want to buy only one apple. Do you think it will weigh more or less than one pound? (It will weigh less than one pound.) If an apple weighs less than one pound it is weighed in ounces. An ounce is part of a pound."

Ask various students to select items on display and weigh each one. Say, "Does it weigh a pound? . . . more than a pound? . . . less than a pound?" List the items with their weights on a chart as you elicit the results from the students.

e.g.,

Item	Pounds	Ounces
penny		1 oz.
book	1 lb.	7 oz.
scissors		4 oz.
bottle	1 lb.	3 oz.
dictionary	6 lb.	2 oz.

Note: At this time it is appropriate to show and explain the abbreviations for pound, (lb.) and ounce, (oz.) to the students.

2.10.08

2.10.08.02 **estimate and weigh familar objects using appropriate customary units**

STRATEGY 1: Prepare and display a scale that measures weight in pounds and ounces and the following objects to be weighed: a box of chalk, 2 shoes, 5 pencils, and a dictionary. Prepare a chart.

e.g.,

What Does It Weigh?		
Item	Guess	Real Weight
chalk		
shoes		
pencils		
dictionary		

Display the dictionary. Say, "Let's guess the weight of this dictionary. Do you think it weighs more than a pound or less than a pound? Guess its weight. (Record the estimate). Now, let's weigh it on the scale. How much does it weigh?" Record the real (actual) weight. Repeat this activity for all of the items. Have students compare the guesses (estimates) with the real (actual) weights.

STRATEGY 2: Prepare and display a scale that measures weight in pounds and ounces, objects that weigh at least one pound and objects that weigh less than one pound. Divide the class into groups of at least five students and say, "Today we will weigh some objects. Some of the objects weigh more than one pound and some weigh less. Before we weigh these objects we will guess their weights. Each group will record their guesses on a chart.

STRATEGY 2: cont'd

e.g.,

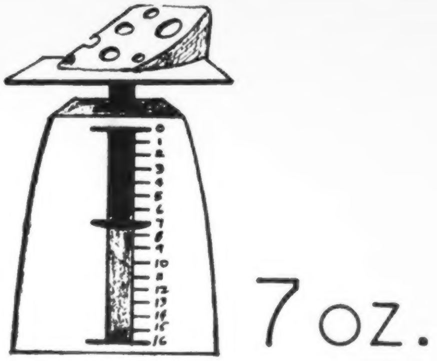
Group 1		
Object	Guess	Real Weight

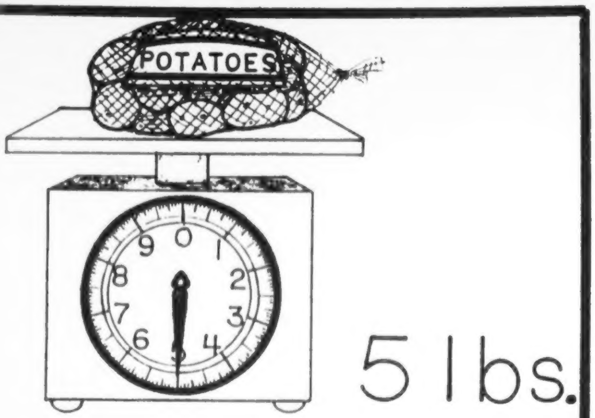
Each member of your group will hold each object and guess its weight. Each group will agree on one good guess. Say, "One student in your group will record your group's estimate on the chart. After all the groups have guessed the weights and recorded them on the chart, a student from each group will weigh an object to determine its actual weight. Each group will compare their estimates with the actual weights and complete their charts."

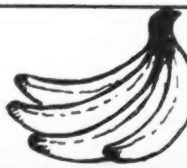
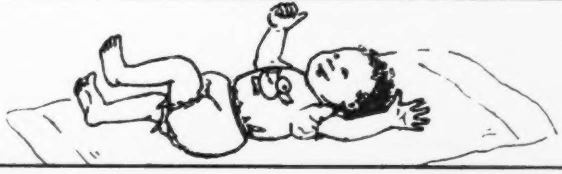
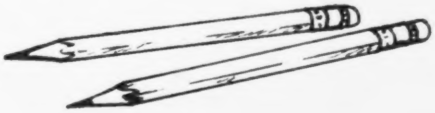
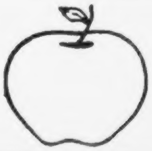
P.O. 2.10.08.01

NAME: ______________________ CLASS: ________ DATE: ________

Look at each picture.
Decide whether each would be weighed in ounces or pounds.
Check the correct box next to each picture.





	oz.	lbs.
		
		
		
		

DO YOU REMEMBER?

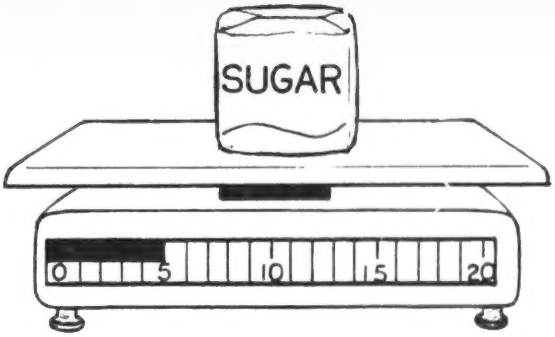
Little Red Riding Hood brought 12 apples and 9 bananas to her grandma. How many pieces of fruit all together did she bring to her grandma?

Solve	Check

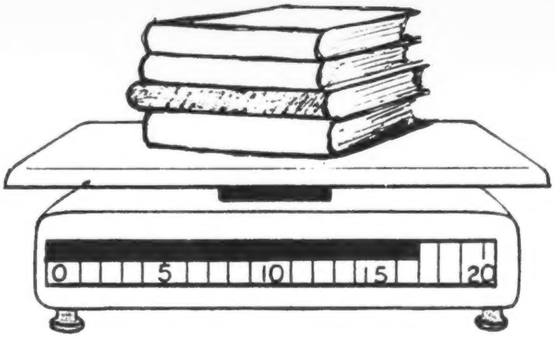
P.O. 2.10.08.02

NAME: ______________________ CLASS: __________ DATE: ________

Write the weight of each item in pounds.


SUGAR
0 5 10 15 20

5 lbs.



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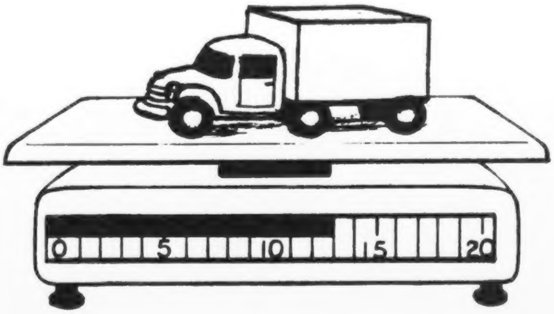

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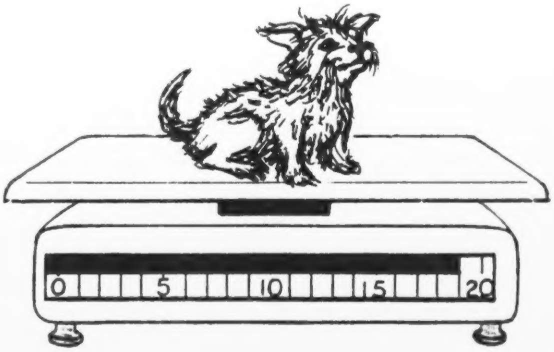

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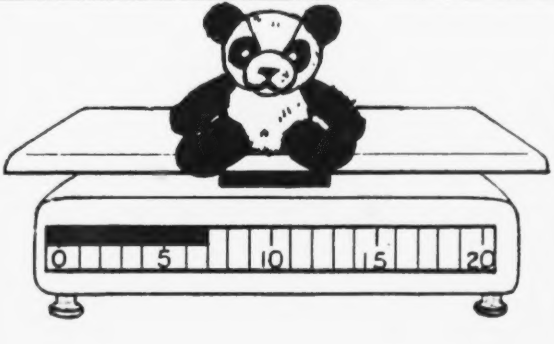

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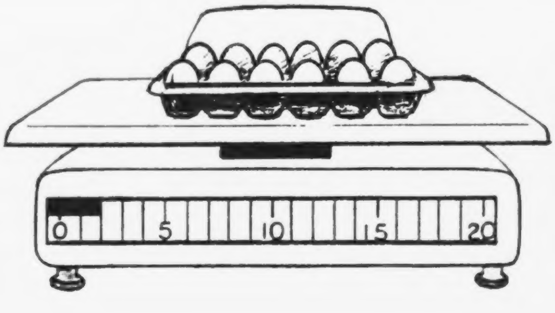

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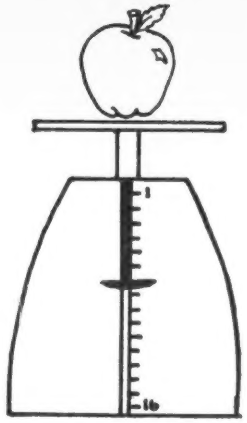
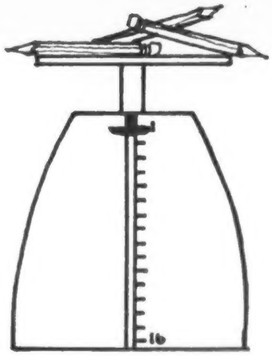
P.O. 2.10.08.02

NAME:____________________________________ CLASS:__________ DATE:________

Find the weight of each item in ounces.



7 oz.



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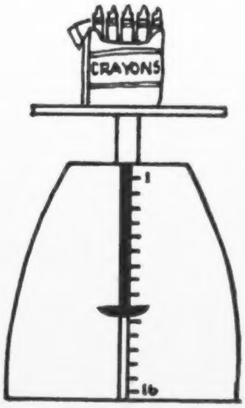
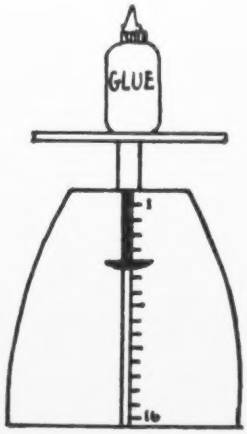

CRAYONS
1
16

____



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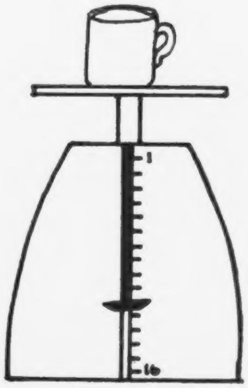

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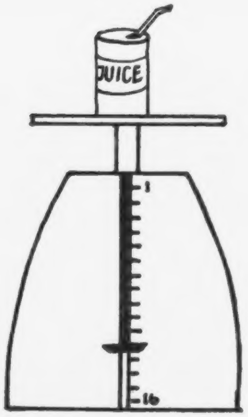

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Unit 45

2.04.02 MULTIPLICATION FACTS FOR FIVES THROUGH 25

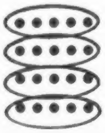
(1-2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

*2.04.02.01A show groups of five through 25;

e.g.,



= 4 groups of five
= 4 x 5

2.04.02.02A count by fives through 25;

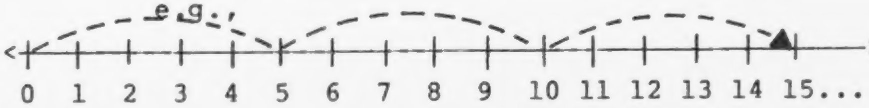
e.g.,

1 group of five = 5

2 groups of five = 10

2.04.02.03A use a number line to demonstrate counting by fives;

e.g.,



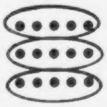
1 group of five = 5

2 groups of five = 10

3 groups of five = 15...

2.04.02.04A demonstrate that multiplication is the process of repeated addition of like addends.

e.g.,



= 5 + 5 + 5
= 3 groups of five
= 3 x 5
= 15

2.04.02

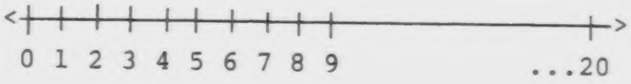
VOCABULARY

TERMS	SYMBOLS
multiplication	x
product	

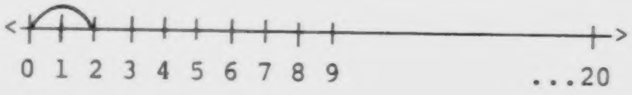
GETTING STARTED

Prepare and display five bags containing 5,10,15,20, and 25 counters respectively, cards numbered 5,10,15,20, and 25 and word cards for each number. Ask the students to count and identify the number of counters in each bag and to match the number and word card with each bag. For additional reinforcement ask all the students to identify each number and word.

Draw a number line from 0 through 20 on the chalkboard.
e.g.,



Say, "We can use this number line to help us count by twos." Starting at 0 draw a curved line to 2.
e.g.,



Ask a student to come to the chalkboard. Say, "Draw a curved line to the next number as you count by twos." Repeat this procedure through 20. Ask the students to count aloud by twos through 20 as they point to the jumps on the number line.

2.04.02

2.04.02.01 **show groups of five through 25**

STRATEGY 1: Select five students to stand at the front of the classroom. Say, "How many students are standing at the front of the room? (5) How many groups are there?" (1) (There is one group of five students.) Write '1 group of five' on the chalkboard. Select a student to draw a pictorial representation to show 1 group of five. (●●●●●) Write 1 x 5 under the words 1 group of five.

e.g.,

• • • • •

1 group of five =
1 x 5 =
5

Say, "One times five means that we have one group with five members. How many groups are there? (1) How many members? (5) How much is one times five?" (One times five equals five.) Repeat this procedure with up to twenty-five students to show 5 groups of five.

e.g.,

●●●●● = 5 groups of 5
●●●●● = 5 x 5
●●●●● = 25
●●●●●
●●●●●

STRATEGY 2: Prepare and distribute twenty-five counters to each student or group of students. Say, "Joey put five baseball cards in one pack. How many baseball cards does Joey have? Let's pretend that our

STRATEGY 2: cont'd

counters are Joey's baseball cards. Let's place five cards in one pack or group. How many groups does Joey have? (1) How many cards does Joey have? (5) Write '1 group of five' on the chalkboard. Say, "We can write this in another way." Write the following on the chalkboard:

1 group of 5
= 1 x 5
= 5

Repeat the procedure to show groups of five through 25.

2.04.02.02 **count by fives through 25**

STRATEGY 1: Prepare 25 discs and display them on the chalkboard. Ask a student to count 5 discs and draw a ring around them. Ask another student to count 5 more discs and draw a ring around them. Repeat this procedure until the 25 discs have been separated into 5 groups of five. Say, "Let's count by fives to find the total number of discs on the chalkboard. (5, 10 ... 25) Now let's count again as the groups are joined." (1 group of five = 5, ... 5 groups of five = 25.)

STRATEGY 2: Prepare and distribute twenty-five chips or counters to each student or group of students. Write the numeral 5 on the chalkboard. Ask the students to identify the numeral and count 5 chips. Say, "How many groups of 5 did you make?" (1) Demonstrate at the chalkboard.
e.g.

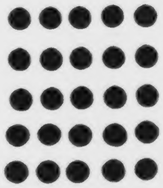
●●●●● 1 group of five = 5

2.04.02

STRATEGY 2: cont'd

Ask the students to write this in their notebooks. Repeat this procedure through 5 groups of five.

e.g.,



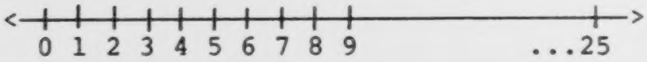
= 5 groups of five
= 5 x 5
= 25

Reinforce counting by fives through verbal repetition by students, e.g., 1 group of five = 5, 2 groups of five = 10, ...

2.04.02.03 **use a number line to demonstrate counting by fives**

STRATEGY 1: Prepare and distribute a 0 through 25 number line to each student. Draw a number line on the chalkboard.

e.g.,



Say, "We are going to see how far we can jump." Draw one jump of five on the number line. Ask the students to do the same on their number lines. Say, "How many times did we jump? How far did we get?

Write 1 jump of five = 5 on the chalkboard. Ask a student to show two jumps of five on the number line. Say, "How many times did we jump? (2) How far did we get?" (10) Write 2 jumps of five = 10 on the chalkboard.

Repeat this activity through 5 jumps of five = 25.

STRATEGY 2: Prepare and display a number line labeled 0 through 25 on the chalkboard, twenty-five oaktag pennies

STRATEGY 2: cont'd

and five oaktag nickels each backed with tape. Say, "Melissa opened her piggy bank. She found twenty-five pennies." Ask a student to place one penny under each numeral on the number line. Say, "Melissa decided to go to the bank. She wanted to exchange her pennies for nickels. She counted out five pennies." Point to the number line and remove the pennies as the students count. Say, "How many nickels did Melissa get for the five pennies?" (Melissa got 1 nickel for the 5 pennies.) Ask a student to place the nickel below the 5 on the number line.

Repeat this procedure through 5 groups of five pennies. For additional reinforcement ask the students to count by fives to find the value of the nickels.

2.04.02.04 **demonstrate that multiplication is the process of repeated addition of like addends**

STRATEGY 1: Prepare and display ten flannel cutouts in 2 groups of five on a flannel board. Say, "How many objects are in each group?" (5) How many objects in all?" (10) Write 5 + 5 = 10 on the chalkboard. Say, "How many groups of 5 objects equal 10?" (2) Write 2 groups of 5 = 10 or 2 x 5 = 10 on the chalkboard. Say, "The sum of 5 + 5 and the product of 2 x 5 are the same." Ask a student to arrange fifteen felt objects in 3 groups of five. Repeat this procedure through 5 + 5 + 5 + 5 + 5 = 25, 5 groups of 5 = 25, and 5 x 5 = 25.

STRATEGY 2: Distribute 25 counting cubes to each student or group of students. Say, "Show one group of five

STRATEGY 2:
cont'd

cubes. Then show another group of five cubes. How many groups did you make?(2) How many cubes are in each group?"(5) We can say that 2 groups of five are the same as 5 + 5. Write the following on the chalkboard:

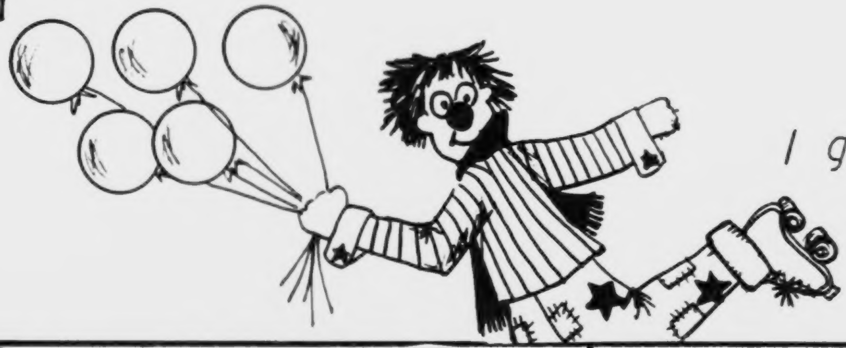
5 + 5 = 10
2 groups of 5 = 10
2 x 5 = 10

As you repeat this procedure with other groups of 5 say, "What is another way to show 5 + 5 + 5 =15? (3 x 5 = 15, 3 groups of 5 = 15),... 5 + 5 + 5 + 5 = 20? (4 groups of 5 = 20, 4 x 5 = 20),... 5 + 5 + 5 + 5 + 5 = 25?" (5 groups of 5 = 25, 5 x 5 = 25)

P.O. 2.04.02.01

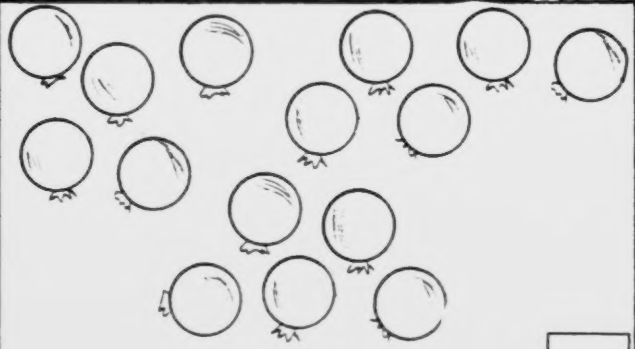
NAME:____________________ CLASS:__________ DATE:________

Circle groups of five balloons and write the total number of balloons in each picture.



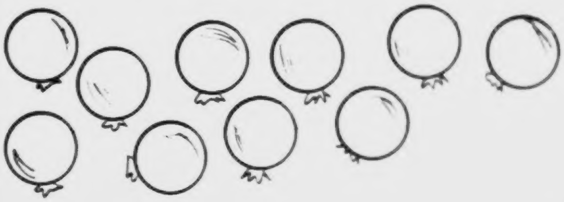
1 group of five = 5

1 x 5 = 5



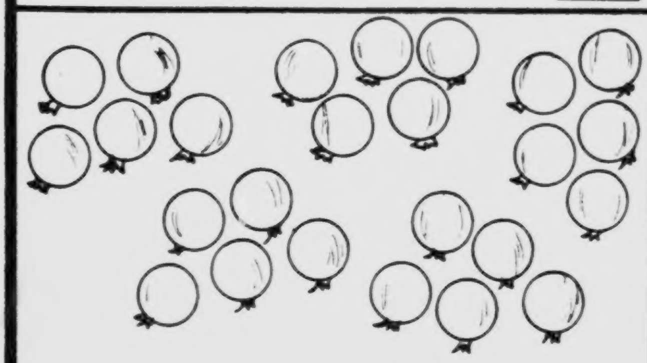
3 groups of five = ☐

3 x 5 = ☐



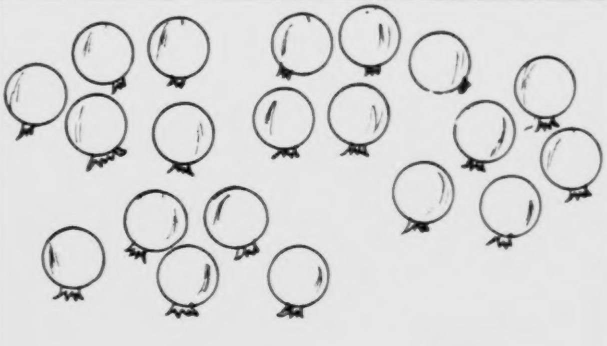
2 groups of five = ☐

2 x 5 = ☐



5 groups of five = ☐

5 x 5 = ☐



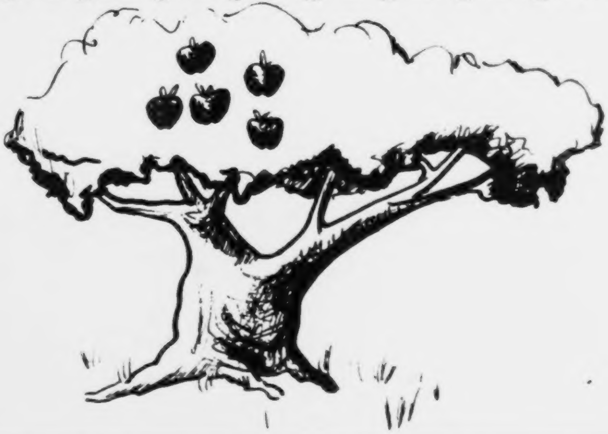
4 groups of five = ☐

4 x 5 = ☐

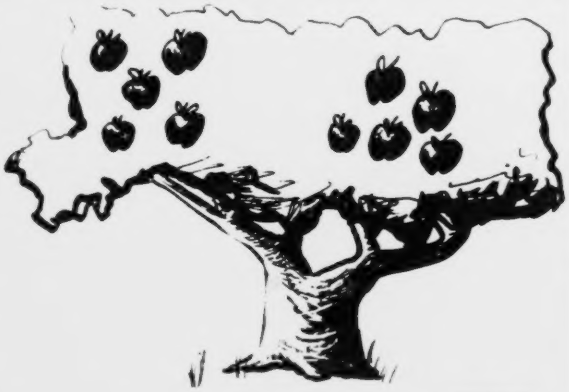
P.O. 2.04.02.02

NAME: ______________________ CLASS: __________ DATE: ________

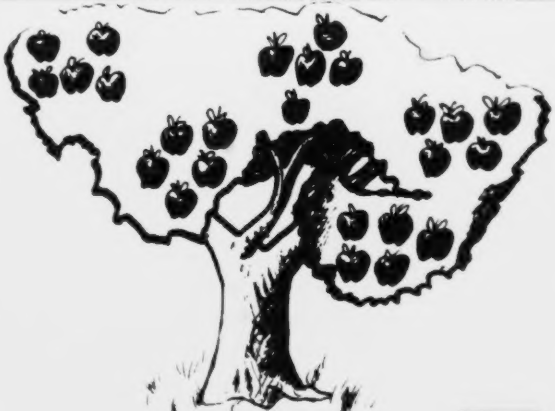
Count the apples on the trees.



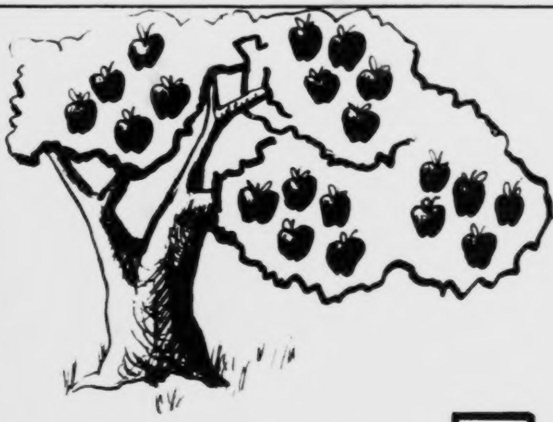
1 group of five = 5



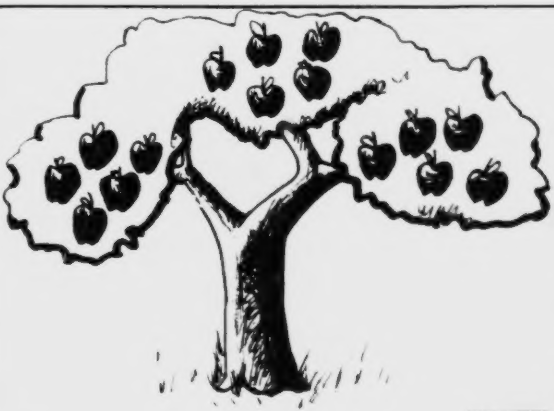
2 groups of five = ☐



5 groups of five = ☐



4 groups of five = ☐

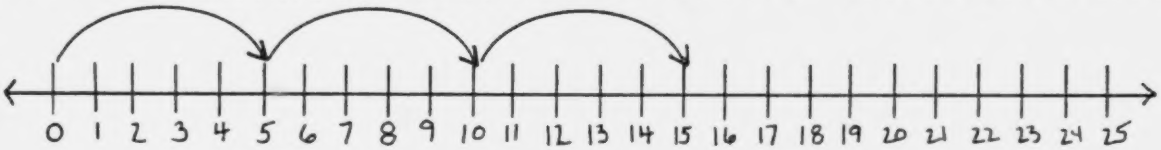


3 groups of five = ☐

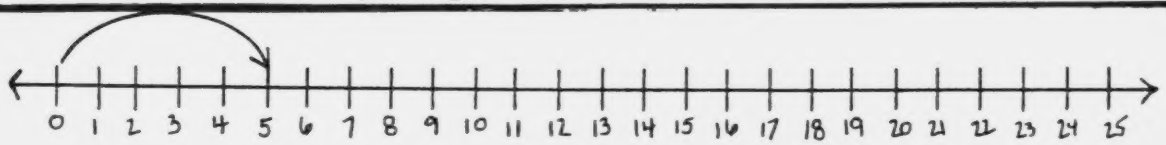
P.O. 2.04.02.03

NAME:______________________________ CLASS:__________ DATE:________

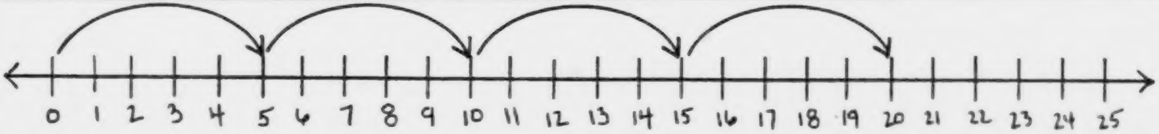
Use the number lines to count by fives.


0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

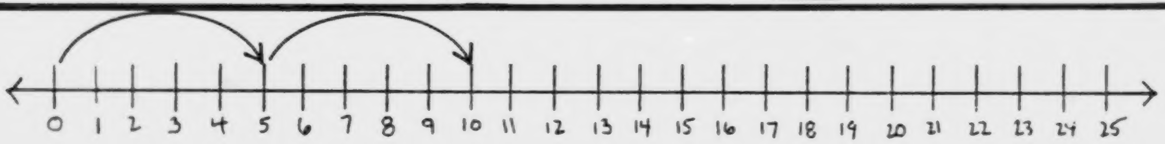
3 groups of five = 15


0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

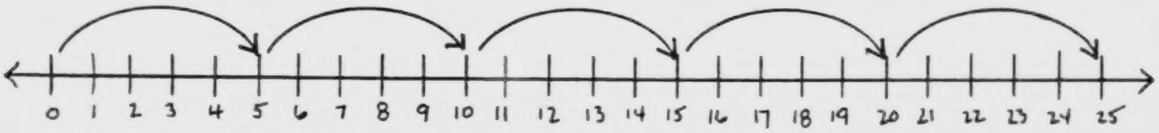
☐ group of five = ☐


0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

☐ groups of five = ☐


0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

☐ groups of five = ☐


0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

☐ groups of five = ☐

DO YOU REMEMBER?

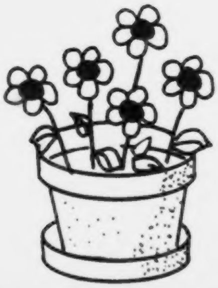
Place an X on each odd number.

321 432 189 563 144

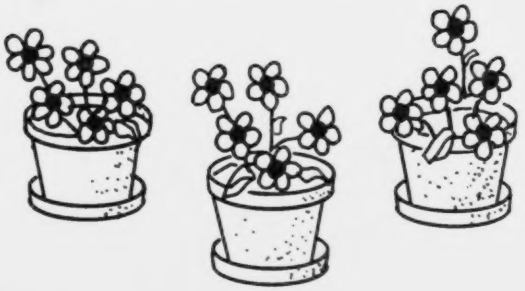
P.O. 2.04.02.04

NAME: ______________________ CLASS: __________ DATE: ________

How many flowers are in the flower pots?

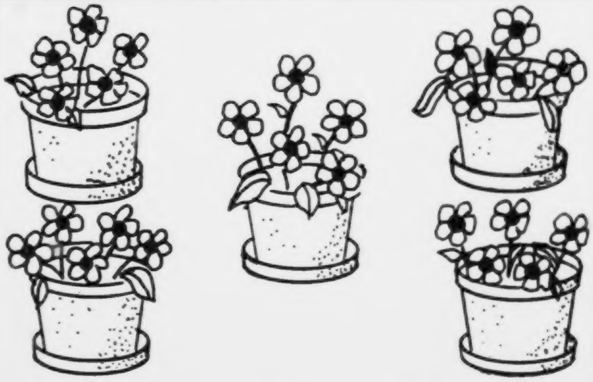


$1 \times 5 = \boxed{5}$



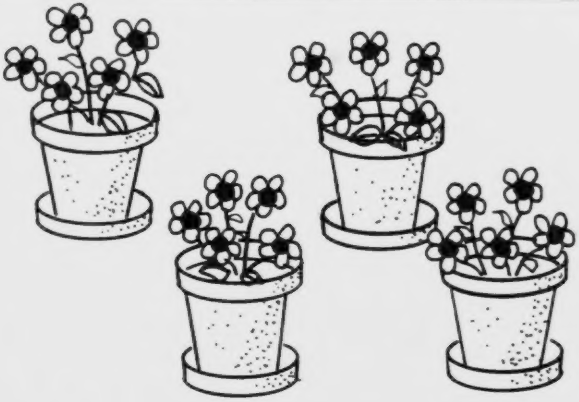
$5 + 5 + 5 = \boxed{}$

$3 \times 5 = \boxed{}$



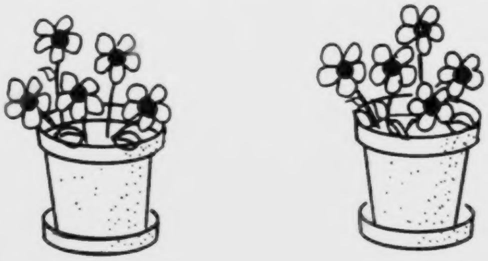
$5 + 5 + 5 + 5 + 5 = \boxed{}$

$5 \times 5 = \boxed{}$



$5 + 5 + 5 + 5 = \boxed{}$

$4 \times 5 = \boxed{}$



$5 + 5 = \boxed{}$

$2 \times 5 = \boxed{}$

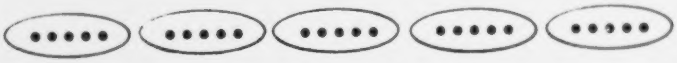
2.05.03 DIVISION FACTS FOR FIVES THROUGH 25

(1-2 lessons)

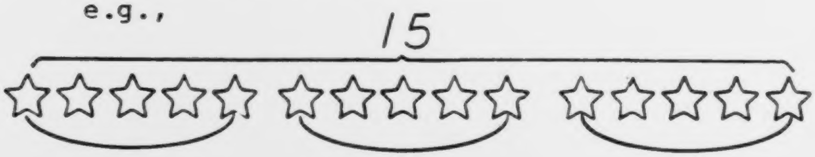
PERFORMANCE OBJECTIVES

The student will be able to...

2.05.03.01A separate up to 25 objects into groups of five without a remainder;
e.g.,



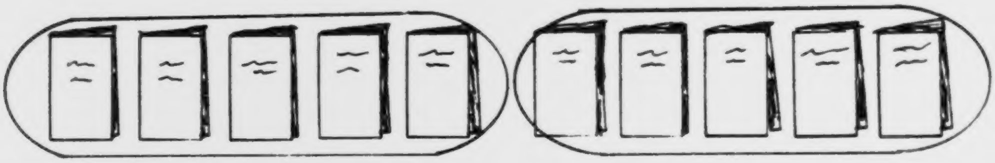
2.05.03.02A identify the number for a given group through 25 and tell how many groups of five are in that larger group;
e.g.,



3 groups of five

2.05.03.03A solve story problems related to skills learned in this module.
e.g.,

The teacher has ten comic books to give out. If each pupil gets five comic books, how many pupils can receive comic books?



Two students can each receive five comic books.

VOCABULARY

TERMS

divide
separate

GETTING STARTED

Prepare and distribute 25 counters and a paper with five large circles on it to each student or group of students. Say, "Place 5 counters into each of three circles. How many counters did you use? Count the counters by fives." e.g., 5, 10, 15. Write 5 + 5 + 5 = 15 on the chalkboard. Say, "Let's write this as a multiplication sentence. How many groups are there? (3) How many in each group?" (5) Write 3 groups of 5 = 15 on the chalkboard. How else may we write this?" (3 x 5 = 15) Repeat this procedure through 5 fives.

Prepare and display a set of cards each with a multiplication problem to reinforce multiplication facts for five through 25. e.g.,

> Carol planted four rows of flowers. If each row has five flowers, how many flowers did she plant in all?

Divide the class into two teams and say, "Today we are going to play a game. We will see how well we remember our multiplication facts by solving the problems on the cards. Each time your team member answers correctly you score one point." Continue the game until all cards have been used.

2.05.03

2.05.03.01 **separate up to 25 objects into groups of five without a remainder**

STRATEGY 1: Prepare and display 25 magnetic discs and distribute 25 counters to each student or group of students. Say, "Twenty-five students are going to a party. Mrs. Brown will place five students at each table. How many tables will she need? These 25 discs represent the 25 students. How can we find out how many tables Mrs. Brown will need?" Draw a circle on the chalkboard. Say, "This circle represents one table." Place five magnetic discs inside the circle. Say, "How many discs are left?" (20) Place another five discs inside another circle. Say, "How many discs are left now? (15) How many tables do we have now?" (2) Continue this procedure until all the discs are placed inside circles while the students do the same at their desks. Say, "How many tables will we need?" (5)

Repeat this procedure separating 5, 10, 15 and 20 counters into groups of five.

STRATEGY 2 Prepare and display 25 straws. Ask a student to count 15 straws. Ask another student to separate the straws by giving groups of five straws to other students. Say, "How many students have straws? (3) How many straws does each student have? (5) We can separate fifteen straws into three groups of five." Ask another student to come to the chalkboard and draw a picture showing fifteen straws separated into groups of five. Say, "How many groups of five do we have?" (We have 3 groups of five.)

Repeat this procedure separating 5, 10, 20 and 25 straws into groups of five.

2.05.03

2.05.03.02 **identify the number for a given group through 25 and tell how many groups of five are in that larger group**

STRATEGY 1: Prepare and distribute one bundle of 25 sticks or straws to each student or group of students. Say, "Count your sticks. Separate the sticks into groups of five. How many groups do you have? (5) Yes, there are 5 groups of five in 25. Remove one group. How many sticks do you have now? (20) How many groups of five are there? (4) Yes, there are 4 groups of five in 20." Repeat this procedure with 15 sticks, 10 sticks, and 5 sticks.

STRATEGY 2: Prepare and display twenty-five pencils. Ask a student to count out 10 pencils. Say, "Charlie has 10 pencils. He shared them equally between his two friends. How many pencils did each friend get?" Ask a student to be Charlie and to separate the pencils into two groups, one group for each of his friends. Say, "How many pencils are in each group? (5) When we separated the 10 pencils into two groups, there were 5 in each group."

Repeat this procedure with 25, 20, 15, and 5, pencils.

2.05.03.03 **solve story problems related to the skills learned in this module**

STRATEGY 1: Prepare and display 20 paper circles. Write a word problem on the chalkboard.

e.g.,

> There were 20 cookies on a plate. Each student received 5 cookies. How many students received cookies?

STRATEGY 1: cont'd

Ask a student to read the problem. Say, "We will act out this problem. The 20 circles represent the 20 cookies. Let's see how many students will get 5 cookies each." Ask a student to take 5 "cookies" from the "plate". Continue this procedure until all the "cookies" have been given out. Say, "How many cookies were on the plate? (20) How many were given to each student? (5) How many students received cookies?" (Four students each received 5 cookies.)

Repeat this procedure with similar problems.

STRATEGY 2: Write a word problem on the chalkboard.

e.g.,

> There are 25 crayons. If we place 5 in each box, how many boxes will we need?

Ask a student to read the problem aloud. Say, "What information does the problem give us? What do we have to find out? How can we solve this problem?" When a plan for solving the problem has been devised, ask a student or group of students to carry out the plan. When a solution has been found say, "How many crayons were there? (25) How many were put in each box? (5) How many boxes were needed?" (Five boxes were needed.)

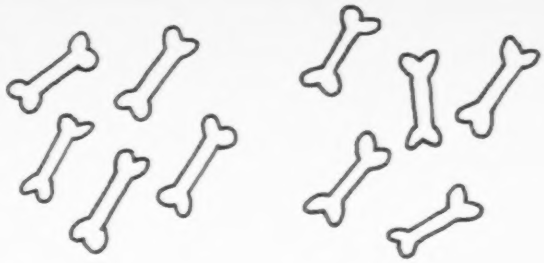
Note: Discuss alternate plans given by students along with their answers.

Repeat this procedure with similar problems.

P.O. 2.05.03.01

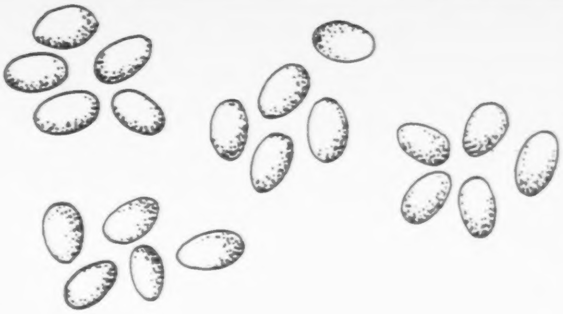
NAME: ______________________ **CLASS:** ________ **DATE:** ________

Draw a ring around each group of five.
Write the missing numerals.



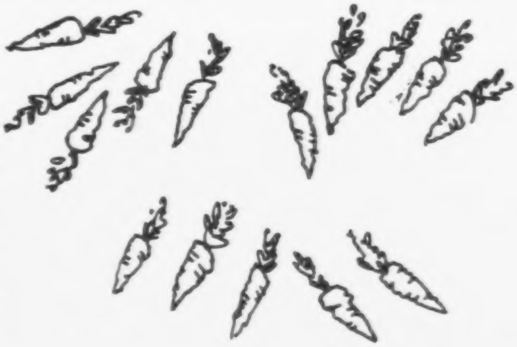
_____ bones

_____ groups of five



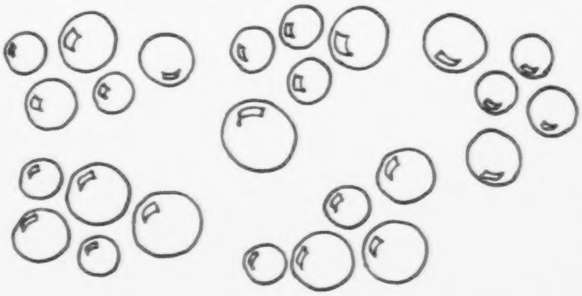
_____ eggs

_____ groups of five



_____ carrots

_____ groups of five



_____ bubbles

_____ groups of five

DO YOU REMEMBER?

Count by ones.

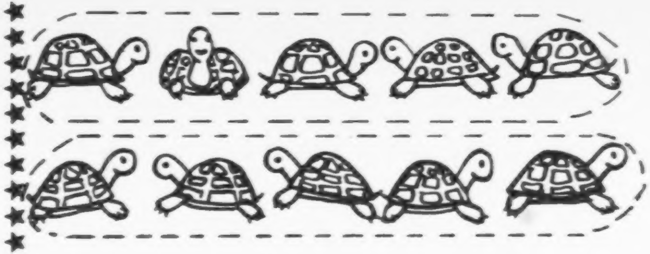
298, 299, _____, _____

599, _____, _____, 602

P.O. 2.05.03.02

NAME: ____________________ CLASS: __________ DATE: ________

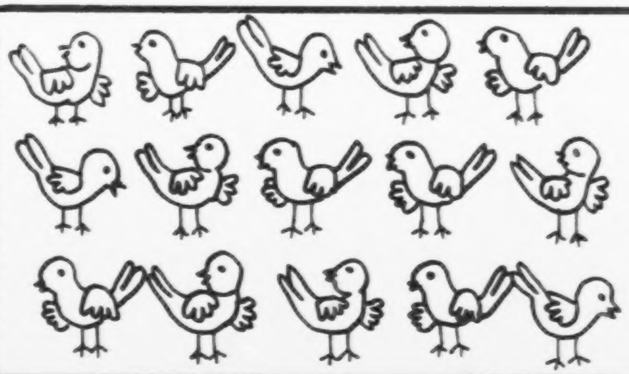
Circle each group of five.
Write the numeral which tells how many groups you made.



10 🐢 in all.

5 🐢 in each group.

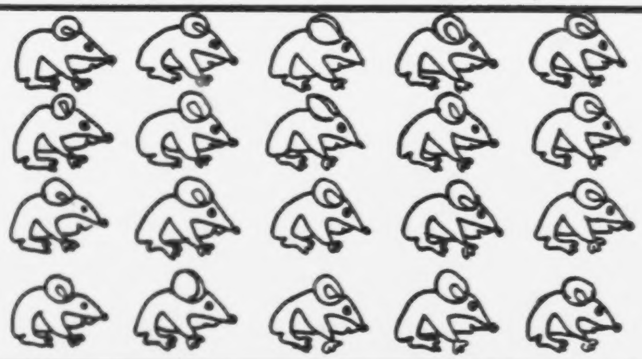
2 groups of five.



15 🐦 in all.

5 🐦 in each group.

☐ groups of five.

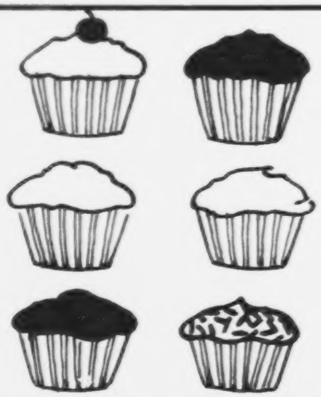


20 🐭 in all.

5 🐭 in each group.

☐ groups of five.

DO YOU REMEMBER?



Mother baked 6 cupcakes.
She put 2 cupcakes on each plate.
How many plates did she need?

__________ plates

P.O. 2.05.03.03

NAME: ____________________ CLASS: ________ DATE: ________

As you solve each problem, find its answer at the bottom of the page.
Write the letter of the problem on the line above the answer.
Write the secret word in the box to complete the sentence.

We are ________ stars!

U

Diana has 15 pencils to place in boxes. If 5 pencils are placed in each box, how many boxes are needed?
____ boxes

E

John has 10 toy trucks. If he gives 5 trucks to each of his friends, how many friends will receive trucks?
_____friends

P

There are 5 cookies in a jar. If 5 cookies are given to each girl, how many girls will receive cookies?
___girl

R

There are 20 pennies in a bank. If 5 pennies are given to each boy, how many boys will get pennies?
____ boys

S

There were 25 bones. 5 bones were given to each dog. How many dogs received bones?
____ dogs

____ ____ ____ ____ ____
5 3 1 2 4

Unit 47

2.01.09 IDENTIFY AND WRITE ROMAN NUMERALS I-XII

(2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

2.01.09.01C identify the Roman numerals I, V, and X; e.g.,

I = 1
V = 5
X = 10

2.01.09.02C identify and write Roman numerals from I through XII (1 through 12). e.g.,

I = 1
II = 2
III = 3
IV = 4
V = 5
VI = 6
VII = 7
VIII = 8
IX = 9
X = 10
XI = 11
XII = 12

2.01.09

VOCABULARY

TERMS	SYMBOLS
Roman numerals	I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII

GETTING STARTED

Say, "A number can be expressed in many ways. It can have many names." Write the numeral 4 on the chalkboard. Say, "Another way to represent 4 is 3+1. Why do you think that is true?" Write 3+1 under the 4 on the chalkboard. Ask the students to think of other names for 4 and list them under 3+1 on the chalkboard. Ask the students to think of both addition and subtraction expressions.
e.g.,

$2 + 2,\ 5 - 1,\ 8 - 4...$

Repeat this procedure with other numbers from 1 through 12.

Place several addition and subtraction problems on the chalkboard with sums or differences which are not greater than 12.
e.g.,

$1 + 1 = \square \qquad 3 + 4 = \square \qquad 12 - 2 = \square$

Ask students to read and complete each number sentence to make a true statement.

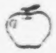
2.01.09

2.01.09.01 **identify the Roman numerals I, V, and X**

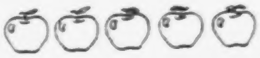
STRATEGY 1: Say, "When people first started hunting animals, how do you think they remembered the number of animals they caught? (They used sticks, stones, traced in the sand...) People have always had many systems of counting. We are going to look at a way to write numbers that was used by the Romans, a group of people who lived a long time ago." Draw an apple on the chalkboard. Say, "Hold up as many fingers as there are apples." After each student holds up one finger, write 1 = I under the apple. Draw five apples on the chalkboard. Say, "Hold up as many fingers as there are apples." After each student holds up five fingers, write 5 = V under the five apples.

Repeat this procedure with ten apples. Write 10 = X under the apples.

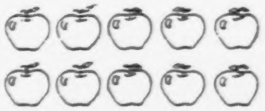
e.g.,



1 = I



5 = V



10 = X

Erase the Arabic numerals and the equal symbols. Say, "Which Roman numeral represents ten? (X represents ten.)... five? (V represents five.)... one?" (I represents one.)

STRATEGY 2: Prepare and display oaktag cards with the Roman Arabic numerals I, V, X, and the numerals 1, 5, and 10. Point to an object in the classroom, e.g., teacher's desk. Say, "Who can find the number that is the same as the number of teacher's desks in this classroom? (1) The Roman numeral I is another

STRATEGY 2: cont'd

way of showing one." Place the cards for the Arabic numeral 1 and the Roman numeral I on the chalk ledge. Write I = 1 on the chalkboard..

Repeat this procedure using five and then ten objects.

Remove the Arabic numeral cards from the chalk ledge, leaving only the Roman numerals I, V, and X. Hold up 5 crayons. Ask a student to choose the card on the chalk ledge which represents the amount of crayons. As the student holds up the card say, "What does the Roman numeral V represent?" (V represents five.)

Repeat this procedure with one, five, or ten objects until each student has had a chance to respond.

2.01.09.02 **identify and write Roman numerals from I through XII (1 through 12)**

STRATEGY 1: Prepare and display oaktag cards backed with tape with the Roman numerals I through XII written on them.

e.g.,

I	II	III	IV	V	VI
VII	VIII	IX	X	XI	XII

Draw twelve rectangles on the chalkboard. Under each rectangle write the Arabic numerals 1, 2, 3,...12 in correct counting order. Display the I, V, and X cards and say, "Who remembers what we call these numerals? (Roman numerals) Who remembers what I, V and X equal?" (1, 5, 10) Ask a student to place the Roman numerals I, V, and X in the

STRATEGY 1: cont'd

appropriate boxes on the chalkboard. Say, "If I is one what is the Roman numeral for two?" Display the II card and explain that I plus I is the same as 2, since 1 plus 1 is equal to two. Repeat this procedure for 3 as I + I + I, 6 as V + I, 7 as V + I + I, 8 as V + I + I + I, 11 as X + I, 12 as X + I + I. Ask various students to place the cards in the appropriate boxes on the chalkboard. Explain that when two letters are together and the value of the one on the left is higher, you add the value of the letters. Now display the IV card. Say, "Here the letter with the lower value, I, is to the left of the letter with the higher value, V. When that happens we subtract the lower value from the higher value. How much is 5-1? (4) Therefore IV equals 4." Repeat this for IX, which is ten minus one, or 9. After all the cards have been placed in the appropriate boxes ask the students to write them in their notebooks with the corresponding Arabic numerals.

STRATEGY 2:

Prepare and display an oaktag clock with Roman numerals. Distribute paper clock faces without numerals, a fastener, and a dial to each student. Point to the oaktag clock and say, "What is different about this clock? (the numerals) You may have seen watches or clocks with these Roman numerals. We have already learned three Roman numerals." Ask students to point to them on the clock. (I, V, X) Say, "What numbers do they represent?" (1, 5, 10) Introduce each number beginning with II through XII. When IV is reached explain that IV is five minus one. When IX is reached, explain that IX is ten minus one. Say

STRATEGY 2: cont'd

"When the lower value (I) comes before the higher value (V or X) we subtract the lower value from the higher value to find the value of the numeral."

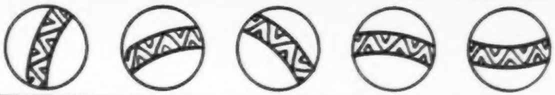
Ask the students to identify each Roman numeral and to use the paper plate, fastener, and dial to make a Roman numeral clock.

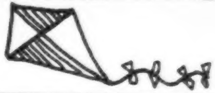
P.O. 2.01.09.01

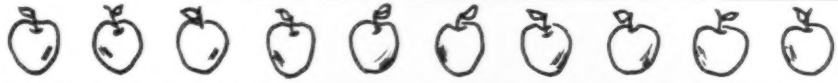
NAME: ______________________ CLASS: ________ DATE: ________

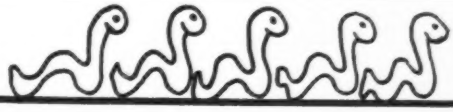
Follow the directions below.

Circle the Roman numeral equal to the number of items in each row.

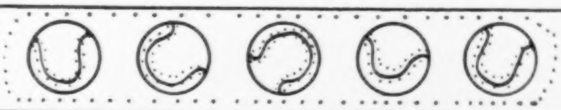

[✓ V], I, X

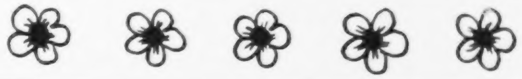

X, V, I


I, X, V

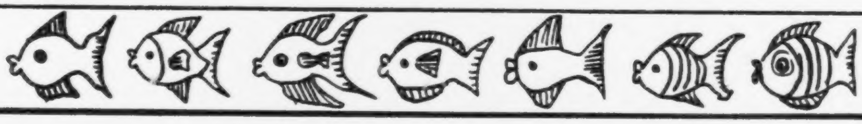

X, I, V

Circle the number of objects equal to the Roman numeral in each row.

V 

I 

X

V 

DO YOU REMEMBER?

Round each number to the nearest ten.

23 rounds to _____ 35 rounds to _____

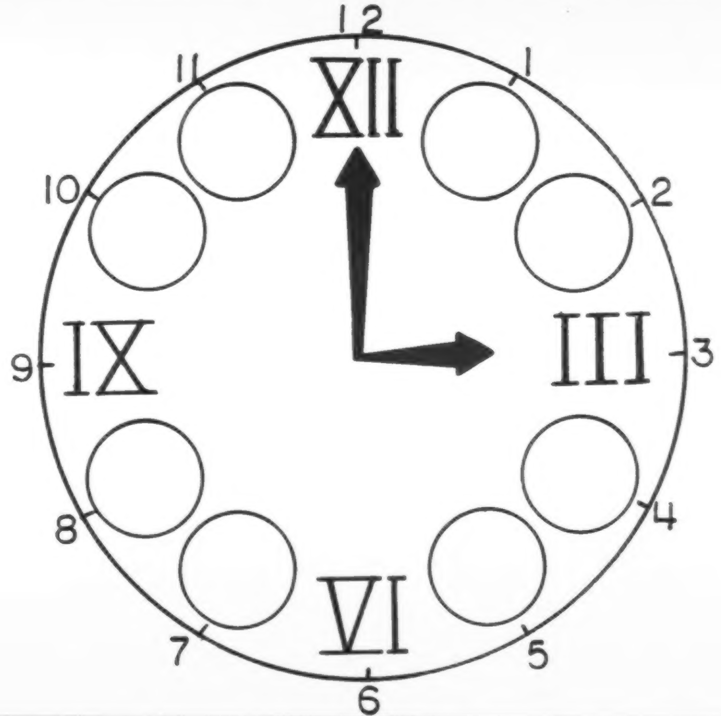
87 rounds to _____ 61 rounds to _____

P.O. 2.01.09.02

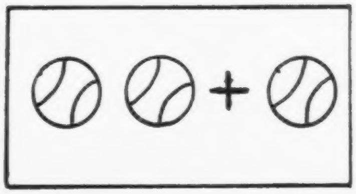
NAME: ______________________ CLASS: __________ DATE: ________

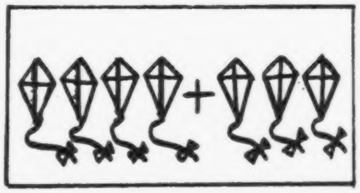
Follow the directions below.

Write the missing Roman numerals on the clock.


12
XII
1
2
3
III
4
5
VI
6
7
8
9
IX
10
11

Write each sum as a Roman numeral.


______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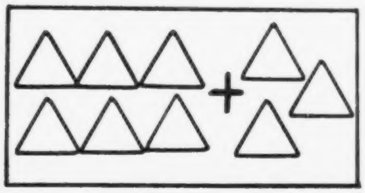
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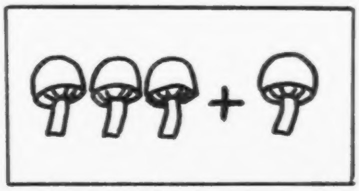
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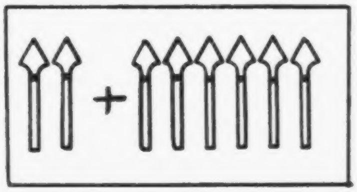
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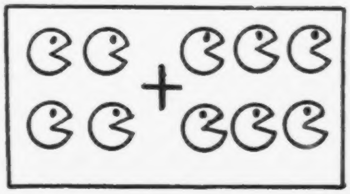
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2.01.10 COUNT FORWARD AND BACKWARD BY PATTERNS OF THREE

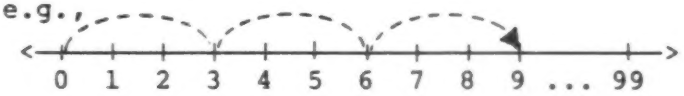
(1-2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

2.01.10.01B identify the numbers from 0 through 99 counting by threes;

e.g.,



2.01.10.02B write and order the numbers from 0 through 99, counting by threes;

e.g.,

0, 3, 6, 9, 12, ... 99

2.01.10.03C count and write the numbers from 99 through 0 (in backward order) by threes.

e.g.,

99, 96, 93, ...

2.01.10

VOCABULARY

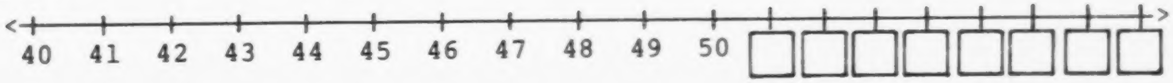
TERMS

forward
backward
patterns

GETTING STARTED

Say a number, e.g., 23. Ask a student to count forward by ones from 23 until you say stop. (23, 24, 25, 26,...) Say another number, e.g., 45. Ask a student to count backward by ones from 45 until you say stop. (45, 44, 42, 43...)
Repeat this procedure, asking the students to continue counting by ones in forward and backward order.

Draw a number line on the chalkboard.
e.g.,



Ask the students to complete the number line using the following unordered numbers, e.g., 53, 55, 54, 52, 57, 51, 56.

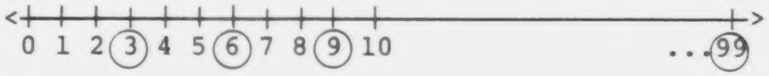
Repeat this procedure using other missing numbers on the number line.

2.01.10

2.01.10.01 **identify the numbers from 0 through 99 counting by threes**

STRATEGY 1: Prepare and display a 0 through 99 number line. Say, "A little rabbit is sitting at zero and will make one hop to number 3." Ask a student to circle the 3. Say, "How many spaces did he hop? (3) If he takes another hop of three spaces where will he land?" (6) Circle the 6. Say, "The rabbit will hop to 99 and rest only on every third number." Ask a student to circle the next place the rabbit will land. (9) Continue until all the multiples of three have been identified and circled.

e.g.,



STRATEGY 2: Prepare and display a hundreds chart. Distribute individual hundreds charts to each student or group of students. Say, "We will count by threes. Let's start at 0 and count 3 numbers. Where are we? (3) Draw a circle around 3. If we count another three numbers, where will we be? (6) Circle the 6." Ask a student to circle the numbers on the display chart as the other students work individually or in small groups. Circle all multiples of three through 99 on the hundreds chart.

Repeat this procedure as the students count aloud from 0 through 99 by threes.

2.01.10.02 **write and order the numbers from 0 through 99, counting by threes**

STRATEGY 1: Prepare and distribute a number line with marks for 0 through 99, but only the numerals 0 and 99

STRATEGY 1: cont'd

indicated. Say, "Freddy Frog lives under the number 99. He visited his friend, Frankie Frog who lives under the zero. Freddie Frog needs help to get home because he is tired. He will rest on every third number. Every time Freddy rests, we must write and circle the numeral on the number line. Freddie will start at zero. Where will his first resting place be? (3) Count 3 spaces, write 3 and circle it on the number line. Where will he rest next?" (6) Repeat this procedure for ordering and writing numbers by threes through 99.

STRATEGY 2: Prepare and place squared material in a box. (99 ones). Say, "There are 99 ones pieces in this box. We will count the pieces in groups of three and list the numbers as we count." Ask a student to stand at the left side of the chalkboard and to write every third number across the chalkboard as it is called out by each student. Say, "I will move around the classroom with this box of squared materials. When I tap your shoulder, take three unit pieces and count in order, whispering the first two numbers and saying the third number loudly. Count 1, 2, 3, and set the pieces aside. A 3 will be written on the chalkboard. The next student I tap will count three more (4, 5, 6) and set the pieces aside. A 6 will be written on the chalkboard. We will continue through 99." Students may take turns writing the numerals on the chalkboard.

For reinforcement ask the students to say the numbers written on the chalkboard.

2.01.10

2.01.10.03 **count and write the numbers from 99 through 0 (in backward order) by threes**

STRATEGY 1: Prepare and distribute a hundreds chart to each student or group of students. Say, "Circle the number 99 on your chart. Billy had 99 pennies. He gave three to John. How many does he have now?" (96) Circle 96. He gave 3 to Pam. How many does he have now? (93) Circle 93. How have we counted, forward or backward? (backward) By what amount have we counted? (by threes) Let's help Billy share the rest of his pennies with his friends by counting backward by threes until he is left with no pennies." Ask various students to write the numbers on the chalkboard as they are circled on the hundreds charts and recited.

Reinforce this concept by asking the students to say the numbers aloud which have been written on the chalkboard, beginning with 99.

STRATEGY 2: Play a game called Guess My Rule. Draw a gameboard on the chalkboard with input and output columns. Start with an input of 21. Say, "The output is 18. The next input is 18 and the output is 15. If the next input is 15, what do you think the output will be?" (12)
e.g.,

Input	Output
21	18
18	15
15	12

STRATEGY 2: cont'd

Say, "What is our rule?" (3 is subtracted from each input to get the output.) Draw another Guess My Rule gameboard on the chalkboard. Ask the students to copy the gameboard into their notebooks and complete it independently.

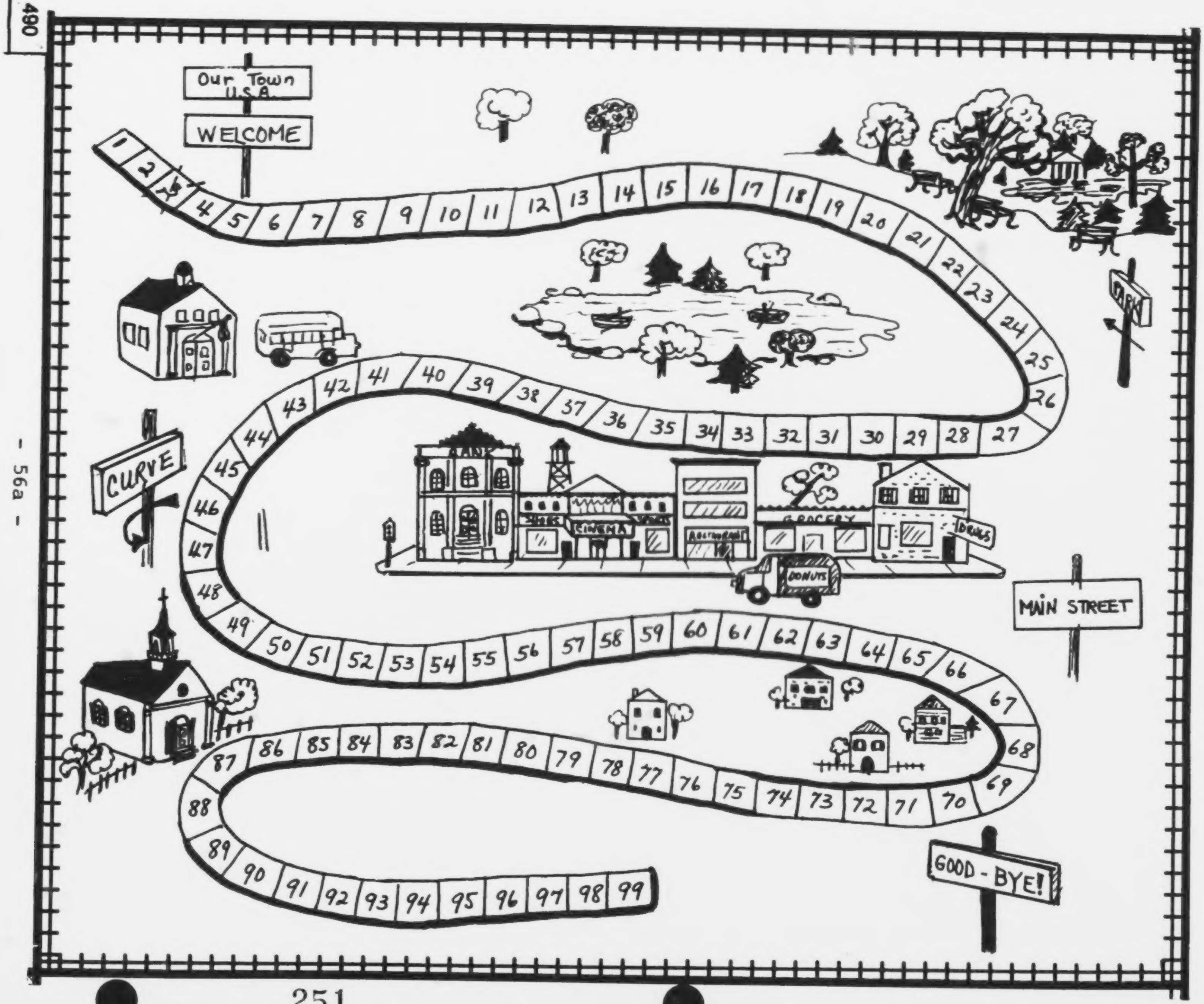
e.g.,

Input	Output
99	96
96	93
93	

P.O. 2.01.10.01

NAME: ______________________ CLASS: __________ DATE: __________

Place an X on every third number on the road through town.


Our Town U.S.A.
WELCOME
PARK
BANK
CINEMA
RESTAURANT
GROCERY
DRUGS
DONUTS
CURVE
MAIN STREET
GOOD-BYE!
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96
97
98
99

P.O. 2.01.10.02

NAME: ____________________ CLASS: ________ DATE: ________

Count by threes and write the missing numerals.

0 , 3 , 6 , ____ , ____ , ____ , ____ , ____

24 , 27 , ____ , ____ , ____ , 39 , ____

45 , 48 , ____ , ____ , 57 , ____ , ____

66 , 69 , ____ , ____ , ____ , 81 , ____

87 , 90 , ____ , ____ , ____

DO YOU REMEMBER?

Write =, <, or > to complete each number sentence.

709 ○ 719

654 ○ 654

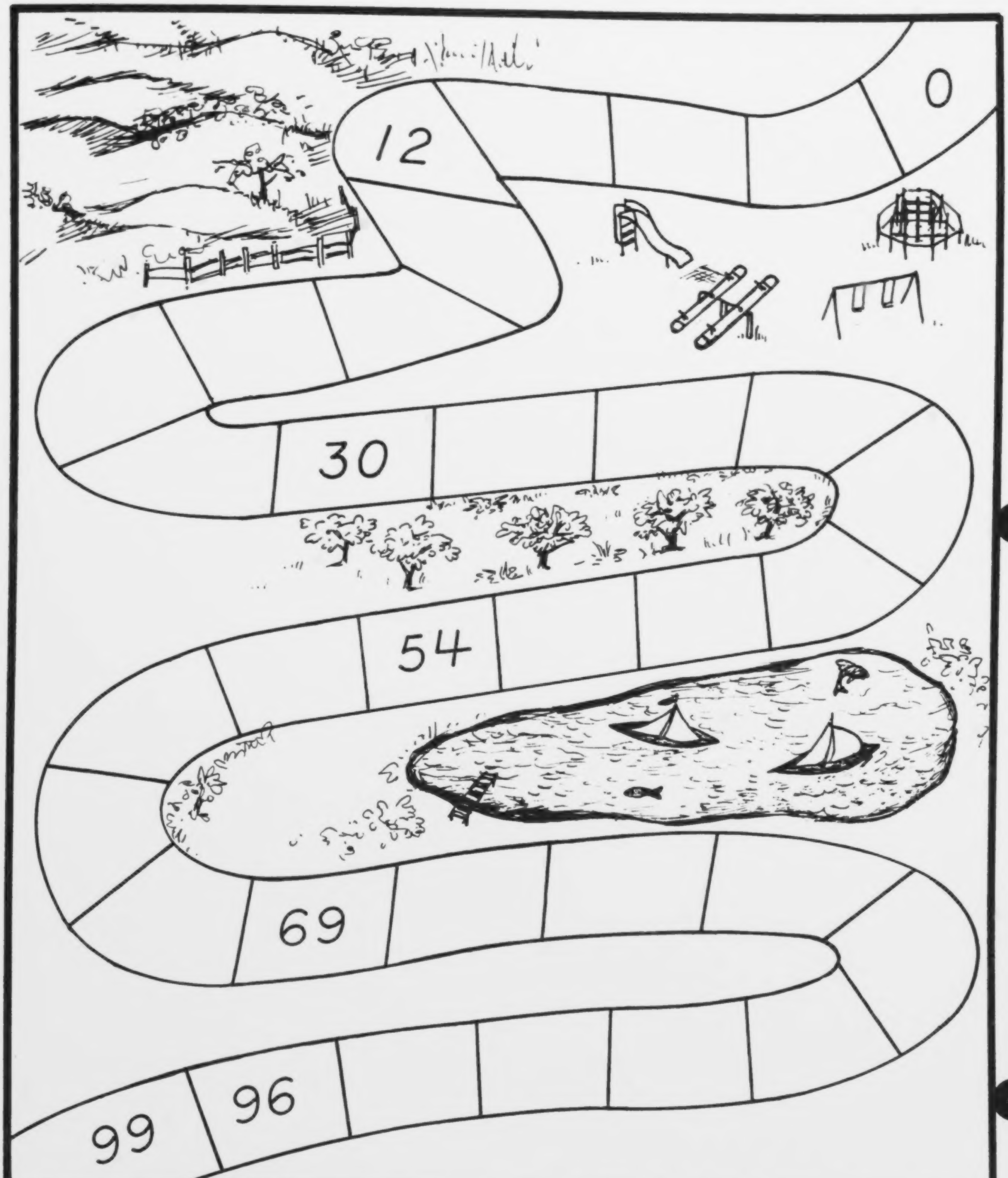
399 ○ 385

909 ○ 999

P.O. 2.01.10.03

NAME: ______________________ CLASS: ________ DATE: ________

Start at 99 and count backwards by threes.
Write the missing numerals.

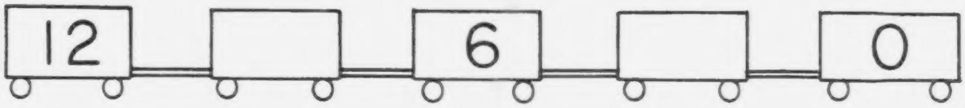

0
12
30
54
69
96
99

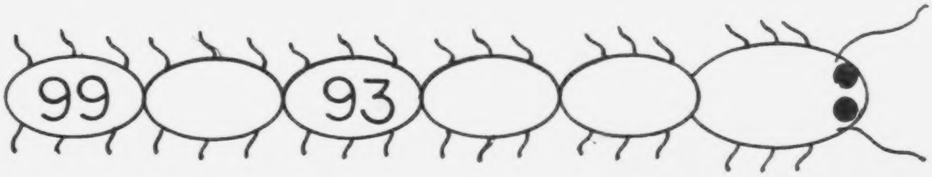
492

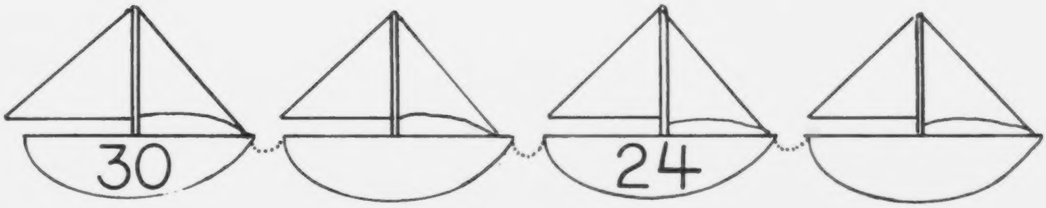
P.O. 2.01.10.03

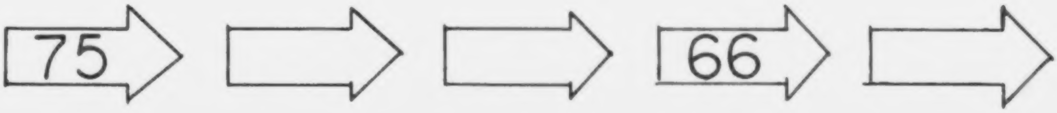
NAME: ______________________ **CLASS:** __________ **DATE:** ________

Count backward by threes and write the missing numerals.









A. 12, 9, ______, ______

B. 45, ______, 39, ______

C. 33, 30, ______, ______

DO YOU REMEMBER?

Solve	Check	Solve	Check
$\begin{array}{r} 57 \\ -\ 9 \\ \hline \end{array}$	______	$\begin{array}{r} 63 \\ -\ 6 \\ \hline \end{array}$	______

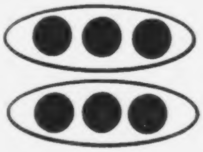
2.04.03 MULTIPLICATION FACTS FOR THREES THROUGH 15

(1-2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

*2.04.03.01A show groups of three through 5 groups of three;
e.g.,

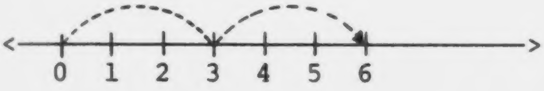


2 groups of three =
2 x 3

2.04.03.02A count by threes through 15;
e.g.,

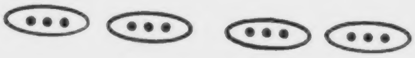
1 group of three = 3
2 groups of three = 6
3 groups of three = 9
4 groups of three = 12
5 groups of three = 15

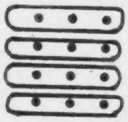
2.04.03.03A use a number line to demonstrate counting by threes;
e.g.,



1 group of three = 3
2 groups of three = 6

2.04.03.04A demonstrate that multiplication is the process of repeated addition of like addends.
e.g., 3 + 3 + 3 + 3 = 4 x 3





2.04.03

VOCABULARY

TERMS	SYMBOLS
multiplication	x

GETTING STARTED

Display a hundreds chart. Using a rhythm instrument tap three times. Say, "Count the number of taps you hear. Who can locate the number of taps you heard on the hundreds chart and say the number's name?" Repeat this procedure, tapping out 6, 9, 12...

Prepare two sets of flash cards; one with multiplication facts for 2 (through 5 twos) and 5 (through 5 fives) and another set showing the same facts using repeated addition.

e.g.,

Set 1	Set 2
5 x 2	2+2+2+2+2
4 x 5	5+5+5+5

Shuffle each set of cards and place them face down on a table.

e.g.,

Set 1 Set 2

Ask a student to turn over one card from each set. If the value of each card is the same, the student may keep the pair of cards. If not, the cards are replaced face down and another student has a turn.

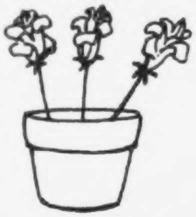
Repeat this procedure until all the cards have been matched.

2.04.03

2.04.03.01 **show groups of three through 5 groups of three**

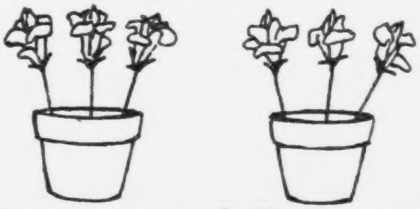
STRATEGY 1: Prepare and display pictures of five flowerpots and fifteen flowers.
Tape one flowerpot to a chart. Ask a student to select 3 flowers and place them in the flowerpot.

e.g.,



Say, "This is one group of three flowers. We can say that one group of three is the same as 1 x 3." Write 1 x 3 on the chalkboard. Tape another flowerpot on the chart and ask another student to select 3 more flowers and place them in that pot.

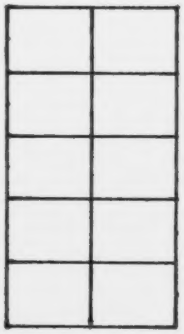
e.g.,



Say, "How many groups of flowers are there? (2) How many flowers are in each group? (3) We can say that two groups of three are the same as 2 x 3." Write 2 x 3 on the chalkboard. Repeat this procedure through five groups of three.

STRATEGY 2: Prepare 15 magnetic discs and paper divided into 10 spaces; one paper for each student.

e.g.,



2.04.03

STRATEGY 2: cont'd

Place three magnetic discs on the chalkboard. Distribute a sheet of paper to each student and say, "Draw three circles in the first box on your paper. (Demonstrate) You have one group of three circles or 1 x 3." Write 1 x 3 on the chalkboard next to the 3 discs. Say, "Write 1 x 3 in the box next to the circle on the on your paper. Now draw two groups of three circles in the next box on your paper." Ask a student to show two groups of three discs at the chalkboard. We can say that two groups of three are the same as 2 x 3. Write 2 x 3 on your paper." Write 2 x 3 on the chalkboard next to the two groups of 3 discs. Repeat this procedure through 5 x 3.

e.g.,

• • •	1 x 3
• • • • • •	2 x 3
• • • • • • • • •	3 x 3
• • • • • • • • • • • •	4 x 3
• • • • • • • • • • • • • • •	5 x 3

2.04.03.02 **count by threes through 15**

STRATEGY 1:

Prepare 15 magnetic discs and enough chips so that each student or group of students receives fifteen chips. Distribute the chips. Draw a circle on the chalkboard and place three magnetic discs inside the circle. Say, "How many discs did I place inside the circle? (3) This is one group of three discs. Use your chips to make one group of three." Write 3 on the chalkboard. Draw another circle on the chalkboard and place three discs inside it. Say, "How many circles do you see? (2) How many discs do you see inside each circle? (3) These are two groups of three discs or 2 x 3 which equal six." Write on

STRATEGY 1: cont'd

the chalkboard:

2 groups of 3 =
2 x 3 =
6

Repeat this procedure through five groups of three. Ask the students to count aloud by threes through 15.

STRATEGY 2: Prepare and display a flannel board with three of the same flannel shapes, e.g., birds. Say, "How many birds do you see? (3) This is one group of three birds. One group of three equals 3." Ask a student to place another group of 3 birds on the flannel board. Say, "How many groups of three do you see now?" (2 groups of three) Write on the chalkboard:

2 groups of 3 =
2 x 3 =
6

Say, "Therefore two groups of three equals 6."

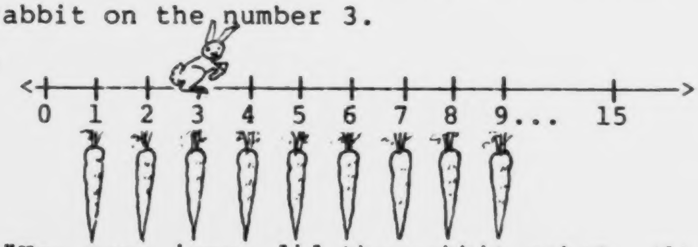
Repeat this procedure through five groups of three.

Ask the students to count aloud by threes through 15.

2.04.03.03 **use a number line to demonstrate counting by threes**

STRATEGY 1: Display a 0 through 15 number line. Place a picture of a rabbit at zero. Draw one carrot under each number, 1 through 15, on the number line. Say, "We are going to help Mr. Bunny jump for carrots." Place the rabbit on the number 3.

e.g.,



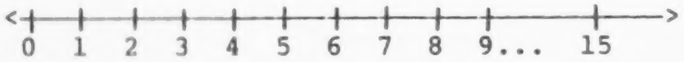
Say, "How many jumps did the rabbit make? (1) How many carrots did the rabbit get?" (3)

STRATEGY 1: cont'd Place the rabbit on the number line at 6. Say, "How many jumps did the rabbit make? (2) How many carrots did the rabbit get? (6) Two jumps gave the rabbit six carrots. Therefore 2 jumps of 3 =
2 x 3 =
6

As the students count by threes repeat this procedure through five jumps of three (5 x 3 = 15).

STRATEGY 2: Prepare a 0 through 15 number line on the floor using a strip of wide masking tape and a marker.

e.g.,



Divide the class into five groups. Ask one child in each group to step up to the number line. Say, "Let's pretend that we are frogs who are very good jumpers. We can jump three spaces in one jump." Ask one child in each group to take a turn jumping from zero to three in a single jump.

Ask another child in each group to come to the number line and stand on 0. Say, "These frogs will make two jumps of 3 spaces each. On which numeral will they land?" (6) Ask the students to say the numbers as they land on them.
Repeat this procedure as the students discover that 3 jumps of 3 or 3 x 3 = 9, 4 jumps of 3 or 4 x 3 = 12, and 5 jumps of 3 or 5 x 3 = 15.

2.04.03.04 **demonstrate that multiplication is the process of repeated addition of like addends**

STRATEGY 1: Place three magnetic discs on the chalkboard. Say,

STRATEGY 1: cont'd

"How many discs do you see?" Write the number 3 under the discs. Say, "We can say that we have one group of three discs or 1 x 3." Write 1 x 3 next to the discs.

e.g.,

1 x 3 = 3 ● ● ●

Place six discs on the chalkboard. Say, "Count three at a time. We can say that 3 + 3 equal 6 or two groups of three equal 6." Write the algorithms 3 + 3 = 6 and 2 x 3 = 6 on the chalkboard.

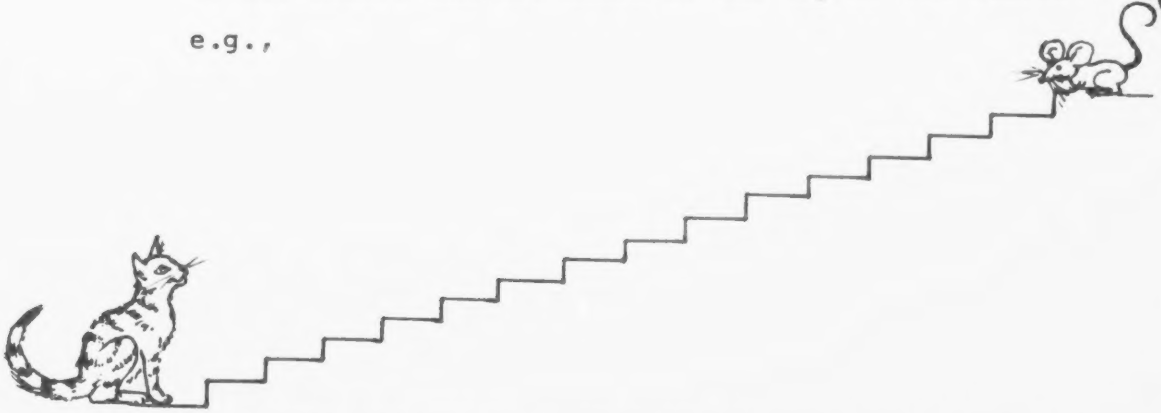
e.g., ● ● ●

3 + 3 = 6 2 groups of 3 = 6 2 x 3 = 6 ● ● ●

Repeat this procedure through five groups of three.

STRATEGY 2: Prepare and display pictures of a cat and a mouse, each backed with tape. Draw a staircase with 15 steps on the chalkboard. Place the cat at the bottom of the stairs and the mouse at the top of the stairs.

e.g.,



Say, "The cat can move only three steps at a time. Each time the cat moves, we say 'three'. How many steps must the cat climb to catch the mouse?" Move the cat three steps at a time and write each three on the chalkboard. e.g., 3 + 3 + 3 . . . Say, "Another way to show 3 + 3 + 3 + 3 + 3 is 5 x 3. How much are 3 + 3 + 3 + 3 + 3? (15) We say that 5 x 3 = 15."

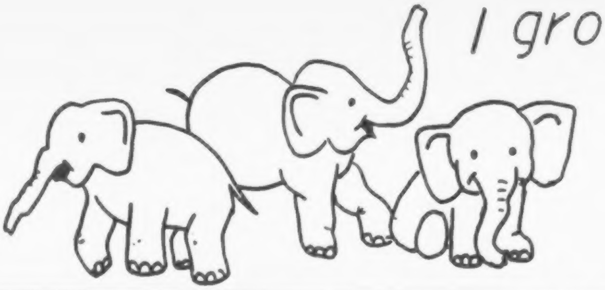
Repeat this procedure moving the mouse to show other multiples of three.

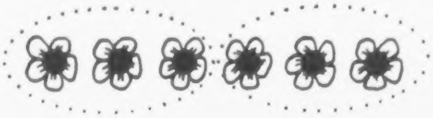
P.O. 2.04.03.01

NAME: ____________________ CLASS: ________ DATE: ________

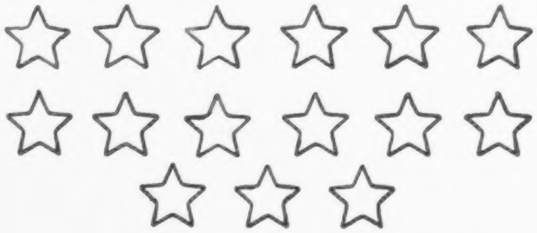
Circle groups of three.
Write the missing numerals.

1 group of three = 1 X 3

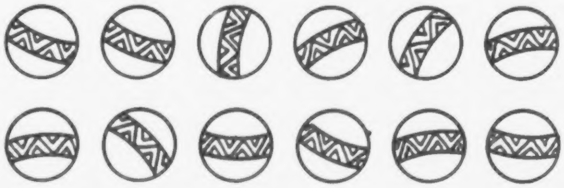




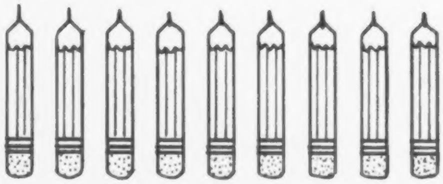
2 groups of three = __ X __



5 groups of three = __ X __



4 groups of three = __ X __



3 groups of three = __ X __

DO YOU REMEMBER?

The King was in the counting house. He counted 36 gold coins and 24 silver coins. How many coins did he count in all?

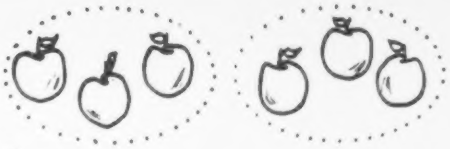
Solve

Check

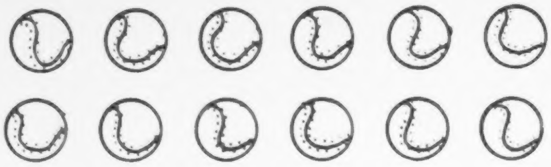
P.O. 2.04.03.02

NAME: ____________ CLASS: ________ DATE: ________

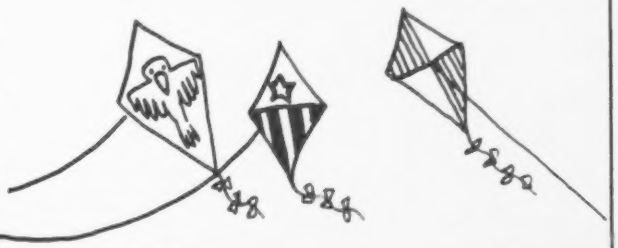
Circle groups of three.
Write the missing numerals.



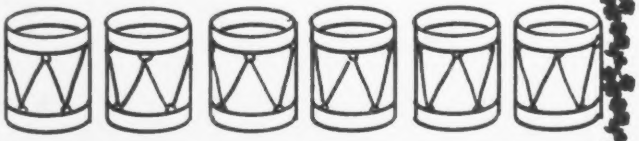
__6__ apples
__2__ groups of three = 6



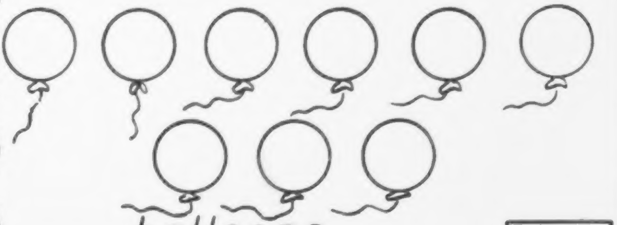
___ balls
___ groups of three = ☐



___ kites
___ group of three = ☐



___ drums
___ groups of three = ☐

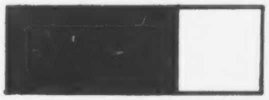


___ balloons
___ groups of three = ☐

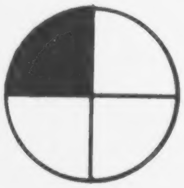
___ stars
___ groups of three = ☐

DO YOU REMEMBER?

What fraction names the shaded part of each figure?



___

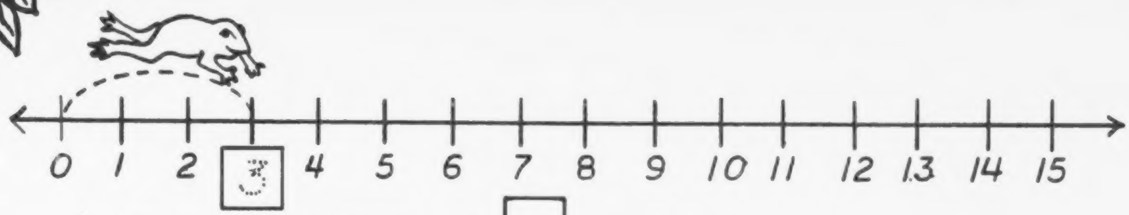


___

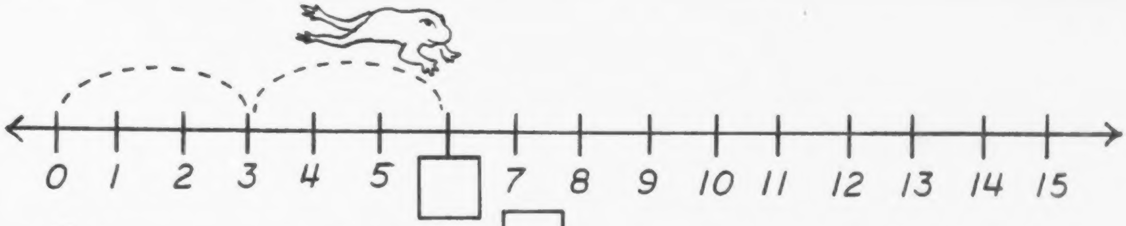
P.O. 2.04.03.03

NAME: ____________________ CLASS: ________ DATE: ________

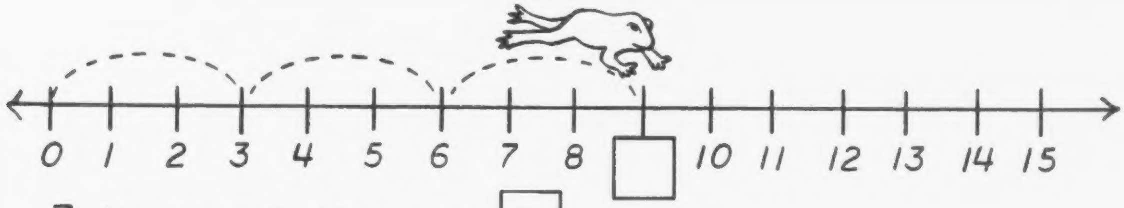
Write the numeral that tells where the frog will land.


0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

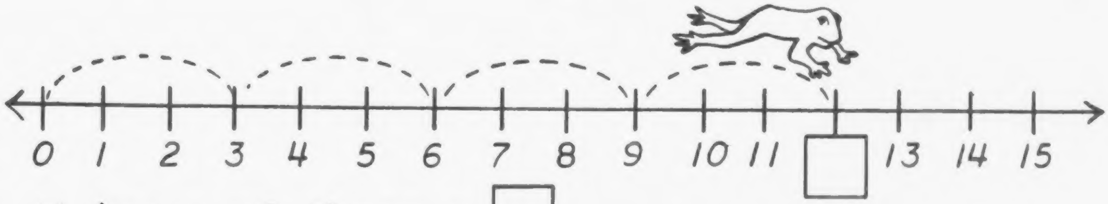
1 jump of three = ☐


0 1 2 3 4 5 7 8 9 10 11 12 13 14 15

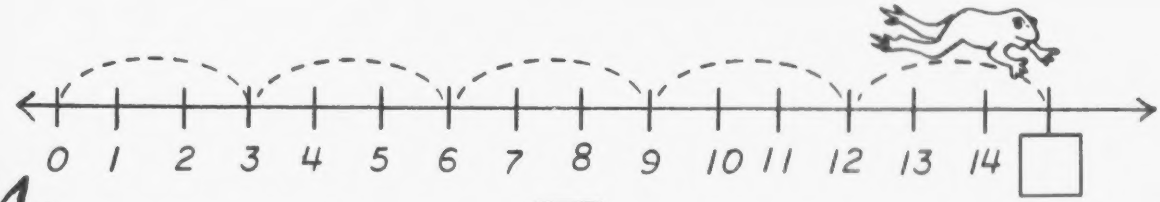
2 jumps of three = ☐


0 1 2 3 4 5 6 7 8 10 11 12 13 14 15

3 jumps of three = ☐


0 1 2 3 4 5 6 7 8 9 10 11 13 14 15

4 jumps of three = ☐

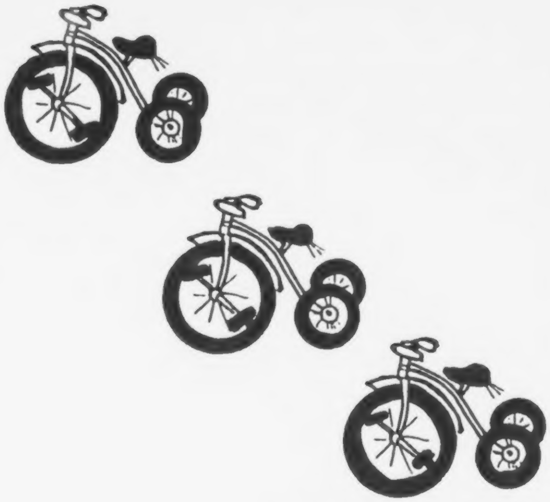

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

5 jumps of three = ☐

P.O. 2.04.03.04

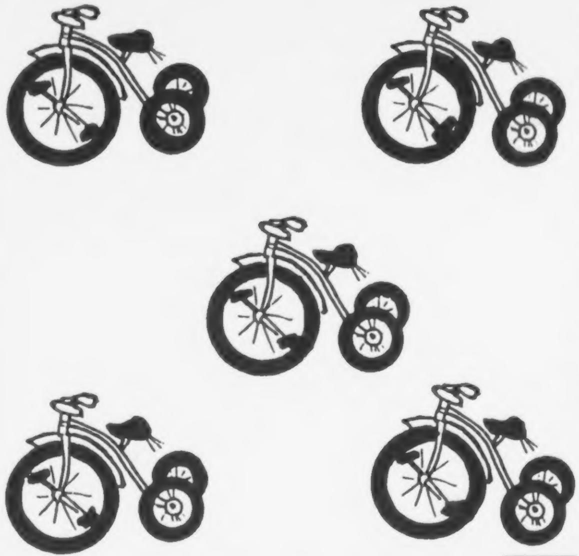
NAME:____________________ **CLASS:**________ **DATE:**________

Count the wheels on the tricycles in groups of three.
Complete each number sentence.



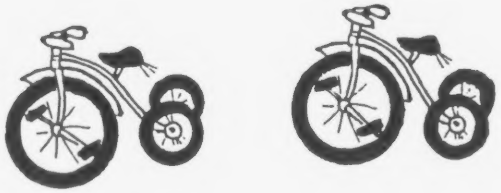
3 + 3 + 3 = ☐

3 × 3 = ☐



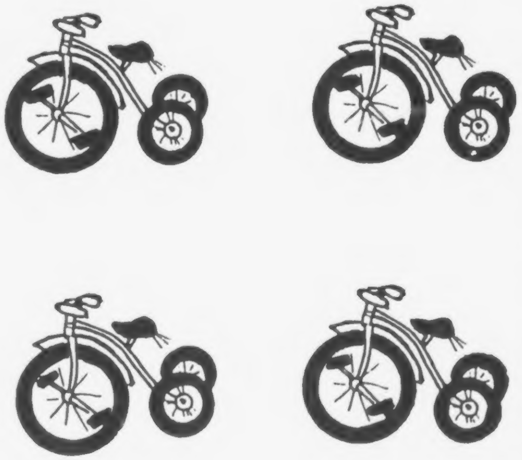
3 + 3 + 3 + 3 + 3 = ☐

5 × 3 = ☐



3 + 3 = ☐

2 × 3 = ☐



3 + 3 + 3 + 3 = ☐

4 × 3 = ☐

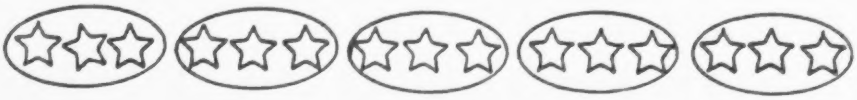
2.05.04 DIVISION FACTS FOR THREES THROUGH 15

(1-2 lessons)

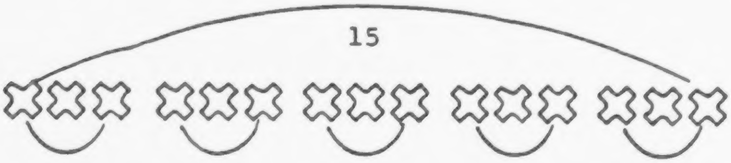
PERFORMANCE OBJECTIVES

The student will be able to...

2.05.04.01A separate up to 15 objects into groups of three without a remainder;
e.g.,



2.05.04.02B identify the number for a given group (through 15) and tell how many groups of three are in that group;
e.g.,



5 groups of three

2.05.04.03B solve story problems related to skills learned in this module.
e.g.,

There are 12 wheels. Each tricycle needs 3 wheels. How many tricycles can John make?

2.05.04

VOCABULARY

TERMS

divided by
separate

GETTING STARTED

Ask three students to stand next to each other. Say, "How many groups of students are standing?" (1 group of 3 students) Ask another group of three students to stand. Say, "How many groups do we have now? (2 groups of 3 students) How many students are standing altogether?" (6) Ask a third group of students to stand. Repeat this procedure until there are 15 students standing. Ask the students to sit in groups of three. Count backwards as these students return to their seats.

Prepare and distribute fifteen counters and a card divided into five parts to each student or group of students. Say, "Write 1, 2, 3, 4, 5 on the card, one digit per section.
e.g.,

1	2	3	4	5

Say, "Place three counters on number 1 and three counters on number 2. How many counters did you use? (6) Count your counters by threes." Write 3 + 3 = 6 and 2 x 3 = 6 on the chalkboard. Say, "Clear your card. Cover four sections by placing 3 counters in each section. How many counters did you use? (12) Count by threes." Write 3 + 3 + 3 + 3 = 12 and 4 x 3 = 12 on the chalkboard.

Repeat this procedure with 15, 9, and 3 counters.

2.05.04

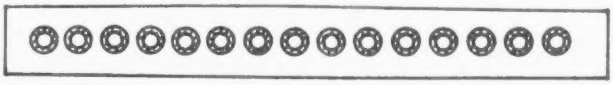
2.05.04.01 **separate up to 15 objects into groups of 3 without a remainder**

STRATEGY 1: Prepare five boxes, each having 3, 6, 9, 12 or 15 objects. Do not mark the number of objects on the boxes. Arrange the students in groups and give each group a box. Say, "Separate the objects into groups of 3. Select a leader for your group and ask him/her to tell the class how many groups of 3 your group has made. With how many objects did you begin? How many groups did you make? Put the objects back into the boxes and pass them to another group."

Repeat this procedure until each group has an opportunity to separate the objects into groups of 3.

STRATEGY 2: Prepare and distribute to each student or group of students 15 chips and strips of paper long enough for the chips to be placed on them in a straight line.

e.g.,



Say, "We will place our chips on the paper, one next to the other." Demonstrate at the chalkboard. Say, "How many chips did you place on your paper (15). Let's remove our chips three at a time and keep count to see how many groups of three we remove. (Demonstrate) With how many chips did we start? (15) How many chips did we remove each

STRATEGY 2: cont'd

time? (3) How many groups of three did we remove? (5) Are there any chips left? (No) We can remove 5 groups of three from fifteen." Repeat this procedure with groups of 12, 9, 6, and 3 chips.

2.05.04.02 **identify the number for a given set (through 15) and tell how many groups of 3 are in that set**

STRATEGY 1: Say, "Freddie works in Charlie Chip's Chocolate Factory. His job is to get boxes ready for the cookies. Each box holds three cookies. Freddie pulled a lever. Out came fifteen cookies. If Freddie puts three cookies in each box, how many boxes will he need?" Place or draw fifteen discs or circles on the chalkboard. Say, "These circles represent the 15 cookies." Ask a student to separate the "cookies" into groups of 3 by drawing a ring around each group of 3. Say, "How many groups were made? (5) How many cookies are in each group? (3) The 15 cookies were separated into 5 groups of 3 cookies each. How many boxes does Freddie need? (Freddie will need 5 boxes.) Freddie pulled the lever again. Out came 12 cookies. How many boxes will he need? How do you know?" Repeat this procedure for 9, 6 and 3 cookies.

STRATEGY 2: Prepare and display up to five dress cutouts and fifteen buttons. Say, "Mrs. Jones is a dressmaker. She needs three buttons for each dress she makes. If she has 15 buttons, how many dresses can she make?" Ask a student to place three buttons on each dress. Say, "How many dresses, each with three buttons, can she make?" (With 15 buttons, we

STRATEGY 2: cont'd placed 3 buttons on each of 5 dresses.) Repeat this procedure for 12, 9, 6 and 3 buttons.

2.05.04.03 solve story problems related to skills learned in this module

STRATEGY 1: Say, "Jim has nine pencils. He wants to give three pencils to each of his friends. How many friends will get pencils?" Ask several students to role play by actually distributing nine pencils. Say, "To how many friends could Jim give pencils?" (Jim can give 3 pencils to each of 3 friends.)

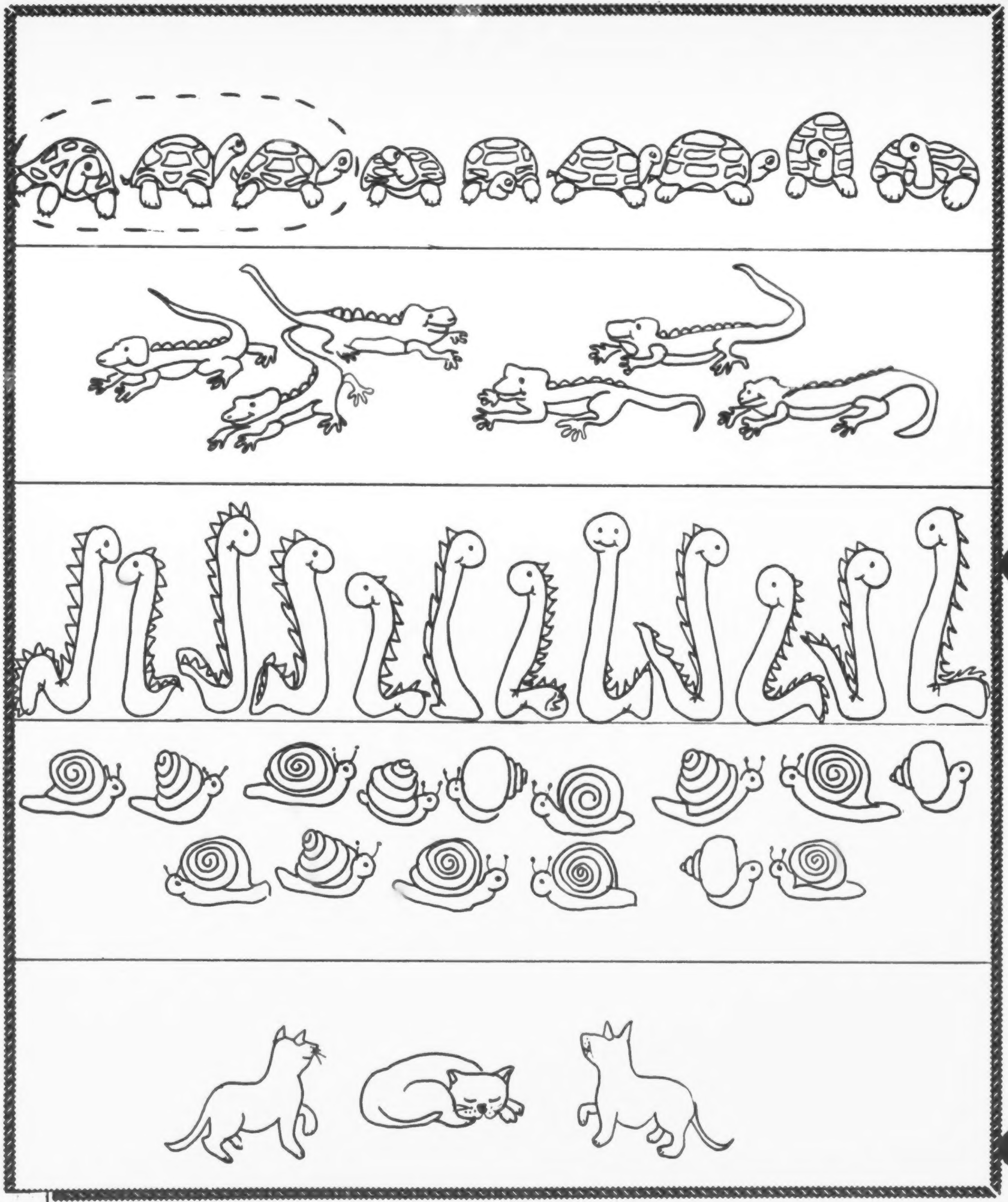
Repeat this procedure using other story problems.

STRATEGY 2: Adapt Strategy 2, P.O. 2.05.03.03, Unit 46.

P.O. 2.05.04.01

NAME: ______________________________ CLASS: ________ DATE: ________

Separate the following objects into groups of 3.

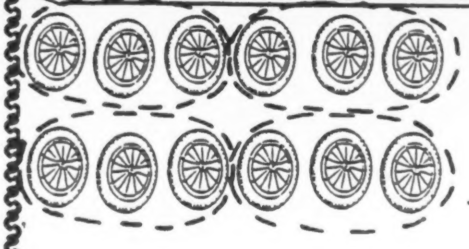


P.O. 2.05.04.02

NAME: ______________________ CLASS: ________ DATE: ________

Count the wheels. Each tricycle gets 3 wheels.
How many tricycles can be made?

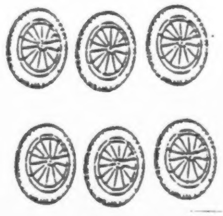
THE TRICYCLE FACTORY



How many tricycles?

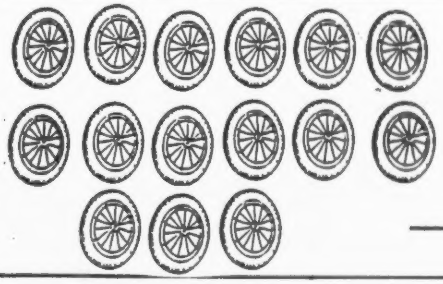
12 wheels

4



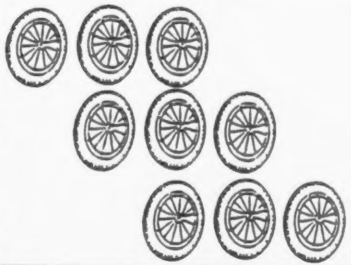
How many tricycles?

____ wheels



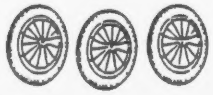
How many tricycles?

____ wheels



How many tricycles?

____ wheels



How many tricycles?

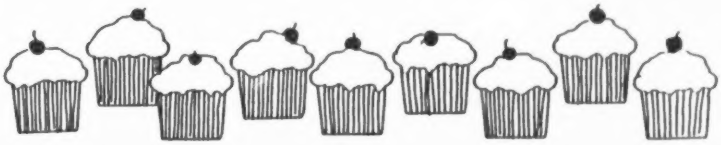
____ wheels

P.O. 2.05.04.03

NAME: ____________________ CLASS: ________ DATE: ________

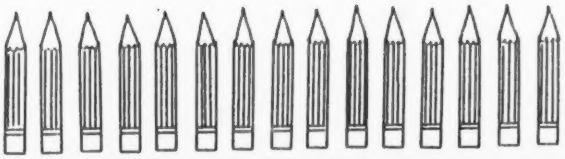
Solve each story problem.

1. There are 9 cupcakes.
   Each package gets 3 cupcakes.
   How many packages are needed?



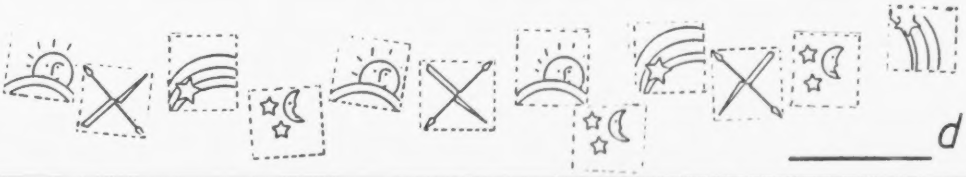
___3___ packages

2. Danny has 15 pencils.
   He put 3 pencils in each bundle.
   How many bundles did he make?



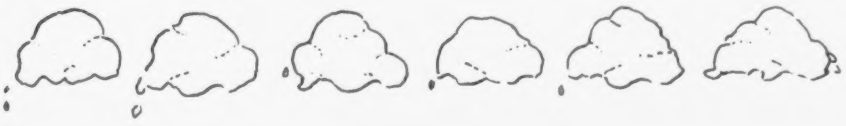
______ bundles

3. I bought a package of 12 stickers.
   Each day I pasted 3 stickers in my book.
   How many days did it take to paste all the stickers in my book?



______ days

4. Mother prepared 6 scoops of ice cream.
   She put 3 scoops into each cone.
   How many cones did she use?



______ cones

2.10.09 WEIGHT - GRAM AND KILOGRAM

(1-2 lessons)

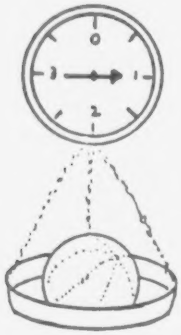
PERFORMANCE OBJECTIVES

The student will be able to...

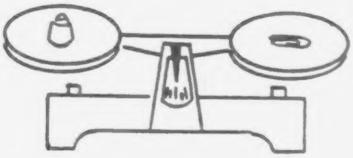
2.10.09.01A identify grams and kilograms as metric units of weight;
e.g.,

A gram is a metric unit of weight.

*2.10.09.02A estimate and weigh familiar objects using appropriate metric units.
e.g.,



A cantaloupe weighs about 1 kilogram.



The paper clip weighs about _____ gram(s).

2.10.09

VOCABULARY

TERMS	SYMBOLS
gram	g
kilogram	kg
metric	

GETTING STARTED

Prepare and display a chart labeled HEAVY - LIGHT and several familiar classroom objects, e.g., chalk, crayons, eraser, textbook, chair, and a jar of paste. Ask several students to decide whether an item is heavy or light without touching the item. Ask them what factors helped them to decide. Write the name of each item under the appropriate column marked "Heavy" or "Light". Say, "Is there a better way to decide whether these items are heavy or light?" (A scale could be used to measure the exact weight of each item.)

Prepare and display a clock, thermometer, centimeter ruler, meter stick, and scale. Prepare at least 10 cards with measurement statements, e.g., It is very hot today. Ask a student to select and read a statement card. Say, "What can we use to measure how hot it is today? (a thermometer) Find the picture of the thermometer and place the statement card on the chalkboard ledge next to the thermometer.

Repeat this procedure with the other cards.

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8

2.10.09

2.10.09.01 **identify grams and kilograms as metric units of weight**

STRATEGY 1: Prepare and display several objects that can be measured in grams or in kilograms (paper clip, pencil, book, rock). Hold up two objects (a paper clip and a textbook) and say, "Which object is lighter?" Hold up the paper clip alone and say, "This paper clip weighs about 1 gram. A gram is a very small metric measure of weight." Introduce the kilogram as a larger measure of metric weight. Hold up the textbook and say, "This book weighs about 1 kilogram." Display the other objects and decide whether each object is measured in grams or kilograms. Write gram (g) and kilogram (kg) on the chalkboard. Say, "g and kg are abbreviations for gram and kilogram." Ask the students to find or say the names of other objects that can be measured in grams or kilograms.

STRATEGY 2: Prepare and display a balance scale, gram and kilogram weights, and several classroom objects to be weighed. Pass around a gram weight and a kilogram weight so that each student can compare the weights. Say, "The lighter weight is called a gram. The heavier weight is called a kilogram. They are both metric units of weight." Place the kilogram weight on one side of the balance and the gram weight on the other. Say, "Which side is heavier? How do you know?" Ask the students to hold up a pencil and feel its weight. Say, "If you want to weigh the pencil which unit of measurement would you use a gram or a kilogram? Why?" Ask a student to place the pencil on one side of the

STRATEGY 2: cont'd

balance and the gram on the other. On the chalkboard write two columns; one labelled g and the other kg. Say, "g is the abbreviation for gram and kg is the abbreviation for kilogram." Elicit which objects belong in each column and record them in the appropriate columns.

e.g.,

g	kg
pencil	record box
eraser	dictionary
piece of chalk	lunch box (before lunch so that thermos is full)

2.10.09.02 **estimate and weigh familiar objects using appropriate metric units**

STRATEGY 1: Prepare a balance scale, several gram and kilogram weights and objects of different weights. Ask a student to hold an object, estimate the weight in grams or kilograms, record the estimate and then check the estimates by using the balance scale and metric weights to find the actual weights. Compare the estimates to the actual weight of each object.

STRATEGY 2: Prepare and display a balance scale, gram and kilogram weights and several very light and heavy objects. Say, "Today we will weigh objects using the metric units of grams and kilograms. Which unit would you use to measure objects which are very light? ...heavy? Display a chart with 5 columns. e.g.,

Name	Object	Unit	Estimate	Actual
Carl	box of crayons			

STRATEGY 2: cont'd

Ask a student to choose an object, e.g., a box of crayons. Say, "Which unit, gram or kilogram, would you use to weigh the object? Why? How many grams do you think the crayons weigh? Record the unit, (kg or g), and the estimate on the chart. Place the crayons on one side of the balance and the grams on the other." Ask the students to write their estimates on a piece of paper. Say, "Look at the balance scale. Do the crayons weigh more or less than Carl's estimate?" Was Carl's estimate too large or too small? Ask the student to remove or to add gram weights until the scale balances. Say, "The box of crayons weighs ______ grams." Record the actual weight on the chart. Say, "Whose estimate was close to the actual weight?"

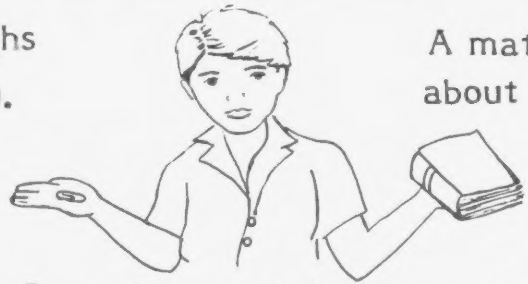
Repeat this procedure, estimating and weighing objects using metric units.

P.O. 2.10.09.01 - .02

NAME: ________________________ CLASS: ________ DATE: ________

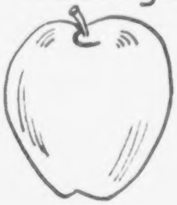
Follow the directions below.

A paper clip weighs about 1 gram (1 g).

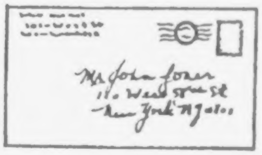


A math book weighs about 1 kilogram (1 kg).

Place a g under the objects which should be measured in grams. Place kg under the objects which should be measured in kilograms.



g



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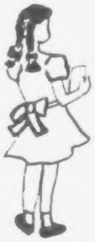

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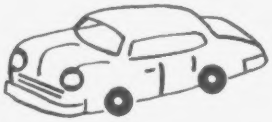

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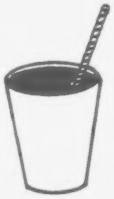

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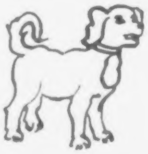


____

Complete each sentence with grams or kilograms.

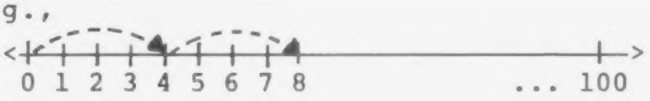
1. A nickel weighs about 5 grams.
2. My brother weighs 60 __________.
3. Our car weighs about 2000 __________.
4. A spoon can hold 10 ________ of sugar.
5. A hamburger weighs 100 __________.

2.01.11 COUNT FORWARD AND BACKWARD BY PATTERNS OF FOUR

(1-2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

2.01.11.01B	identify the numbers from 0 through 100 counting by fours; e.g., 
2.01.11.02B	order and write the numbers from 0 through 100 counting by fours; e.g., 0, 4, 8, 12, 16, ...
2.01.11.03B	order and write the numbers from 100 through 0 (in backward order) counting by fours. e.g., 100, 96, 92, 88,...

2.01.11

VOCABULARY

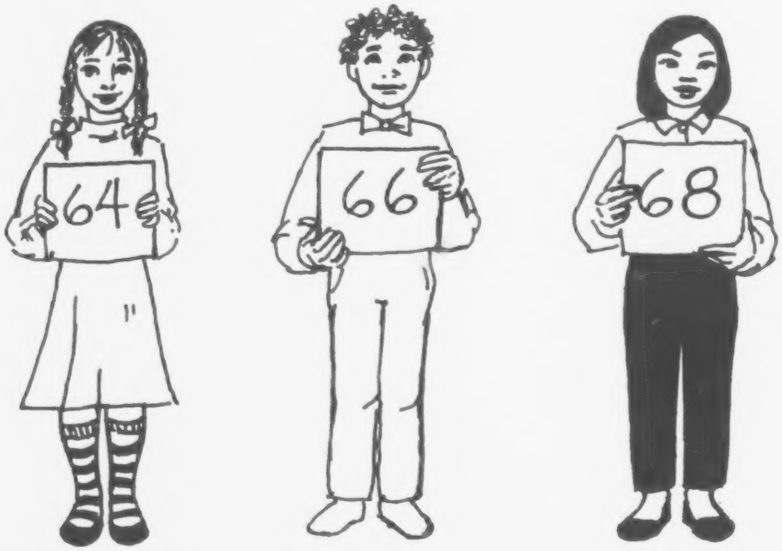
TERMS

count
order
backward order

GETTING STARTED

Play Buzz with the students. Say, "Every time a multiple of two is reached, a student will say "Buzz" instead of the number, e.g., 1, "Buzz", 3, "Buzz"...

Prepare and distribute to each student a card having a multiple of two. Say, "We are going to play Before and After. I will ask a student to come to the front of the room and show his/her number. The students who have the cards with numbers which come before and after that number, when counting by twos, will place themselves on either side of the first student in the correct counting order. Another student will read the three numbers which are being displayed."



Play should continue until all the students have had a turn.

520

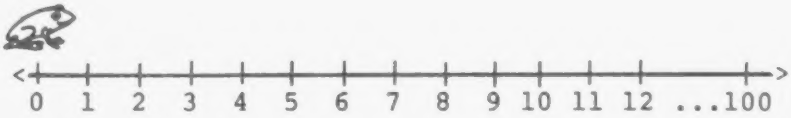
2.01.11

2.01.11.01 **identify the numbers from 0 through 100 counting by fours**

STRATEGY 1: Prepare and display a hundreds chart, placing covers over the multiples of four from 0 through 100. Say, "I live in a large apartment house. My friends live in every fourth apartment. I want them to come out and play, but I don't want to disturb my other neighbors. Let's whisper their apartment numbers as I point to them. When I point to my friends' apartments say their numbers out loud so they will come out and play." Remove the coverings as the children say the multiples of four aloud.

STRATEGY 2: Prepare and display a number line from 0 to 100, and a stick with a cut-out of a frog placed at zero.

e.g.,



Say, "Freddy Frog wants to play with his friend on the other side of the river. There are many slippery rocks. He knows he will not fall if he lands on every fourth rock. Who can say the number of the rock to which Freddy must jump? If you are incorrect Freddy will fall into the water and start all over again." Point with the frog to each number as the children identify the multiples of four. When there is an error the frog is returned to 0 and the students must begin again.

2.01.11.02 **order and write the numbers from 0 through 100 counting by fours**

STRATEGY 1: Prepare a set of cards numbered in multiples of four from 0 through 100. Distribute the first ten cards. Ask the students holding these cards to come to the front of the room and stand in the correct order when counting by fours. Ask the seated students to say the numbers and write them in their notebooks.

Repeat this procedure with the other cards and new participants.

STRATEGY 2: Prepare and display a number line from 0 through 100 omitting multiples of 4. Say, "I have forgotten some of the numbers on this number line. Who can fill in the missing numbers?" Ask the students to write their answers in their notebooks before saying their answers aloud. After each correct response, ask a student to write the missing number in the appropriate place on the number line. Ask the seated students to repeat the number. Check the written responses in their notebooks.

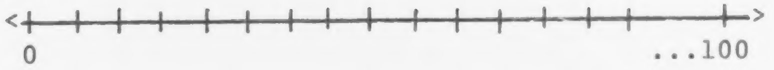
Repeat this procedure until all the missing numbers have been stated and written. Ask the students to reread, in order, the answers they have written.

2.01.11.03 **order and write the numbers from 100 through 0 (in backward order) counting by fours**

STRATEGY 1: Prepare and display a number line from 0 to 100, counting by fours. Label only the 0 and 100.

STRATEGY 1: cont'd

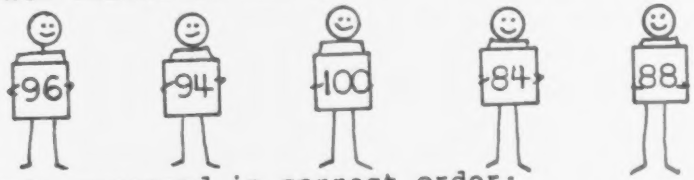
e.g.,



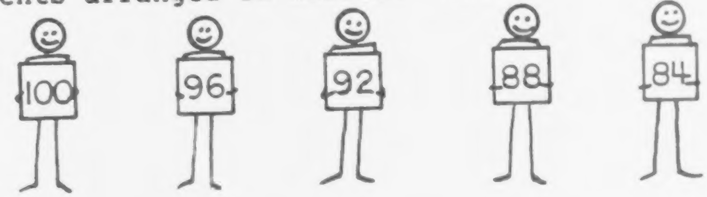
Prepare a set of numeral cards for 0 through 100, counting by fours. Give one card to each student. Say, "Look at your card. Then turn it around and hold it in front of you so others can see the numeral." Call the names of 5 students whose numeral cards are sequential. Ask them to arrange themselves in a row at the front of the room in correct order counting backwards by fours.

e.g.,

Students called to the front of the room:

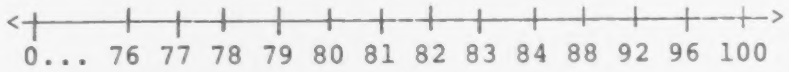


Students arranged in correct order:



Ask another student to write the numerals in the correct backwards counting order on the number line.

e.g.,

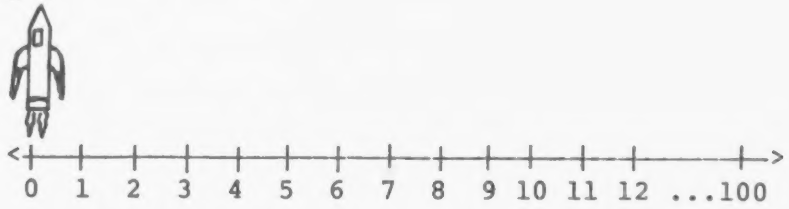


Repeat this procedure using the numeral cards until all the multiples of four through 100 have been ordered and written on the number line.

2.01.11

STRATEGY 2: Prepare and display a number line with an illustration of a rocketship at zero.

e.g.,



Say, "Our astronauts are taking a trip to the moon. They will count backward from 100 to 0 by fours in their countdown. They are in a hurry to lift off. Who would like to help them by starting at 100 and counting backward by fours?" Ask several students to participate.

As the students respond, circle the multiples of four from one hundred to zero and say, "Lift Off!" Repeat this procedure several times. Ask the students to write these countdown numbers in their notebooks.

P.O. 2.01.11.01

NAME: ______________________ CLASS: __________ DATE: ________

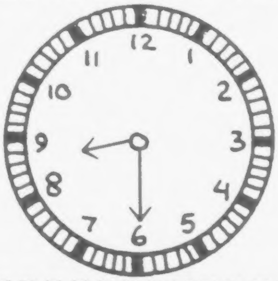
This monster can only eat numerals that are named when he counts by fours. Feed the Number Monster by coloring the numerals he can eat. Hint: The monster wants twenty-five numerals.

NUMBER MONSTER

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

DO YOU REMEMBER?

Circle the time shown on the clock.

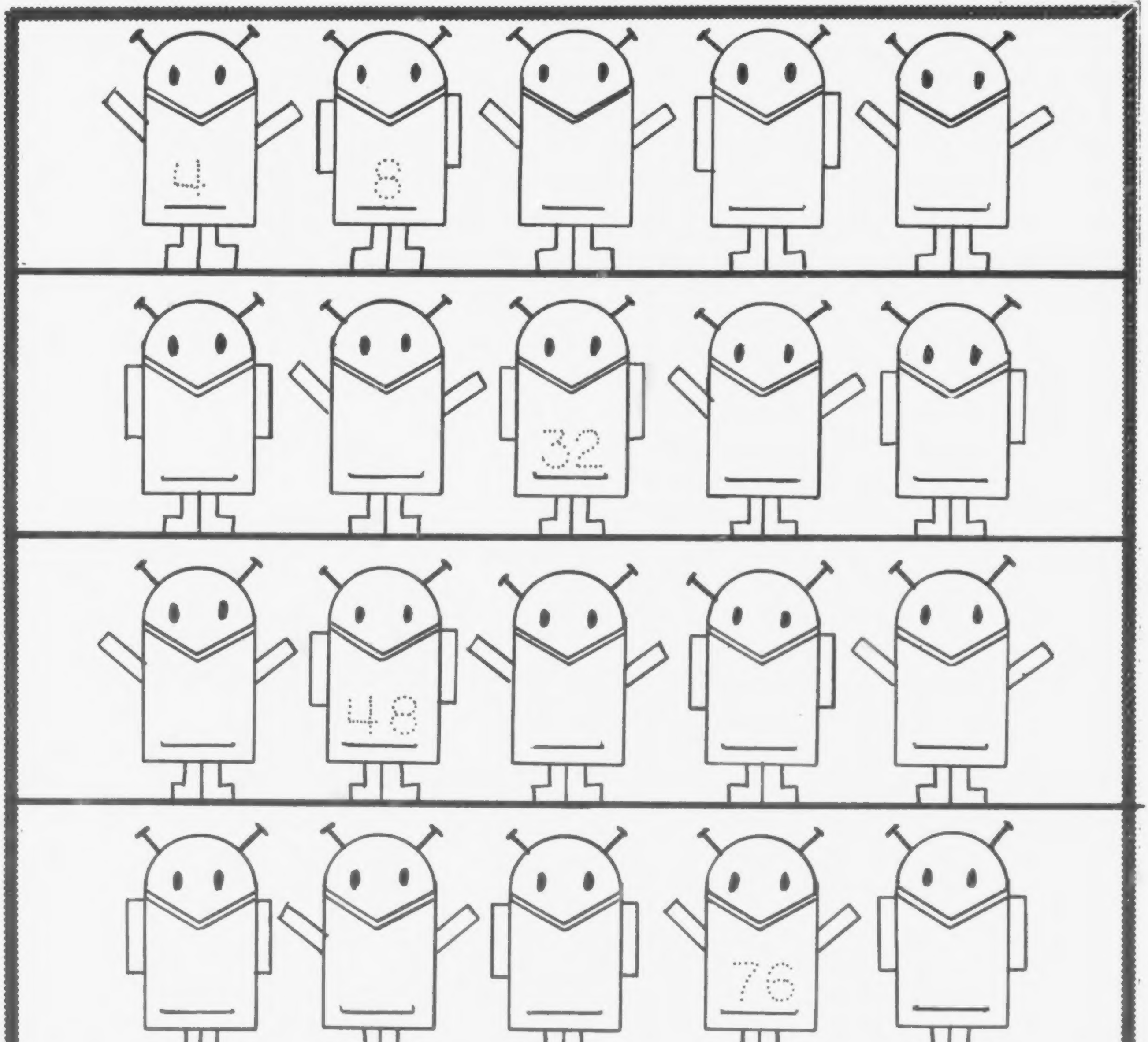


6:30 8:30 9:30

P.O. 2.01.11.02

NAME: ______________________________ CLASS: __________ DATE: ________

Count by fours and write the numerals on the robots.

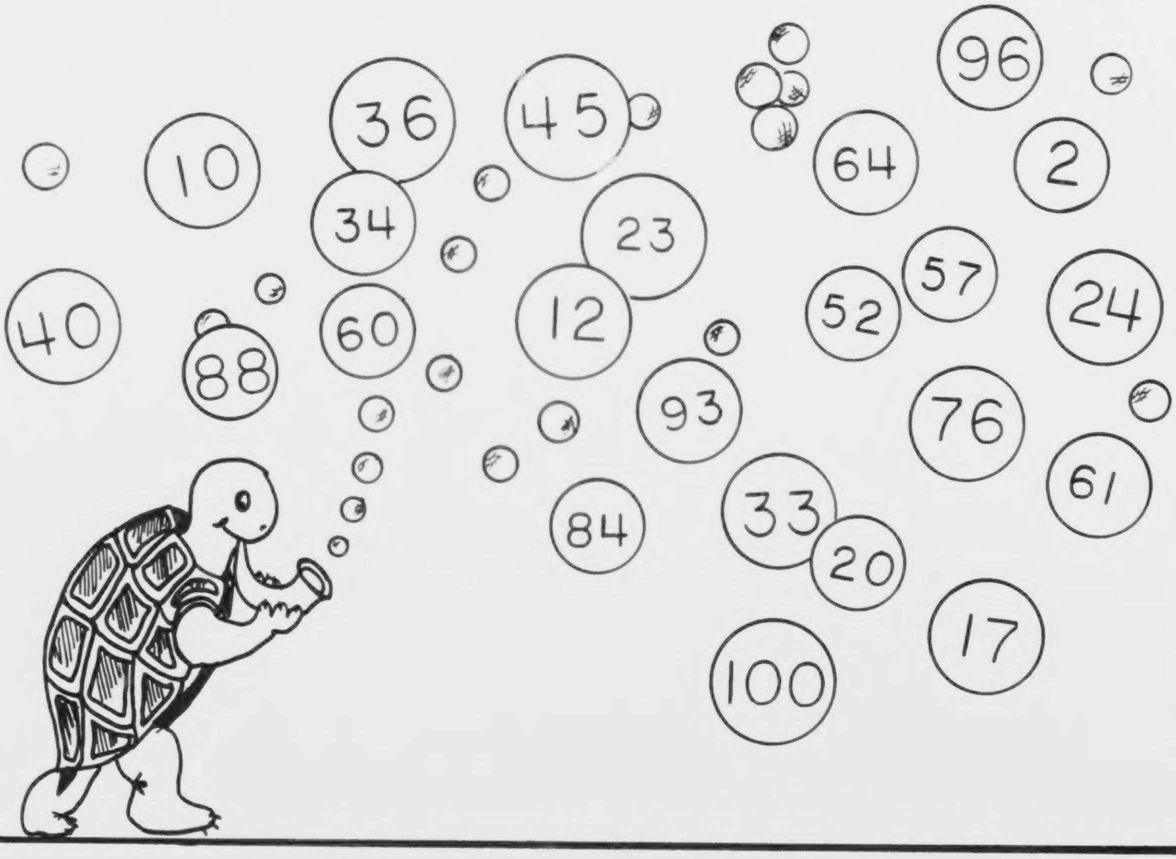

4
8
32
48
76
100

P.O. 2.01.11.02

NAME:____________________ CLASS:________ DATE:________

Count by fours.
After you write each numeral, color the balloon with the matching numeral.

0, 4, 8, __, 16, __, __, 28, 32, __, __, 44, 48,
__, 56, __, __, 68, 72, __, 80, __, __, 92, __, __.


96
36
45
10
64
2
34
23
40
60
12
52
57
24
88
93
76
61
84
33
20
17
100

DO YOU REMEMBER?

5+5= __ x5

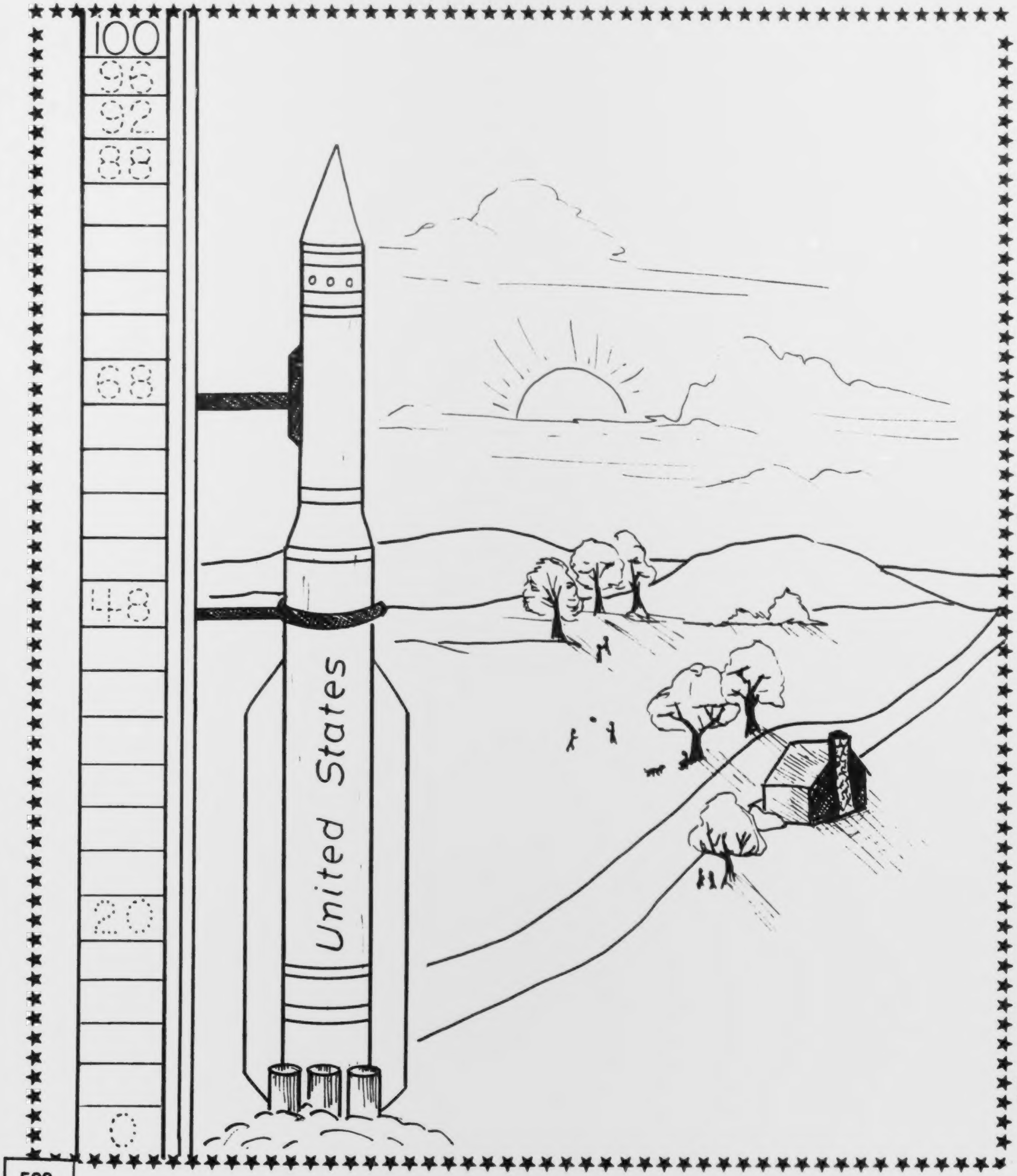
5+5+5= __ x5

5+5+5+5=4x __

P.O. 2.01.11.03

NAME: ______________________ CLASS: __________ DATE: ________

The count down for blast off begins at 100.
Count backwards by fours to blast off at 0.


100
96
92
88
68
48
20
0
United States

2.04.04 MULTIPLICATION FACTS FOR FOURS THROUGH 20

(1-2 lessons)

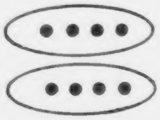
PERFORMANCE OBJECTIVES

The student will be able to...

*2.04.04.01A show groups of four through 5 groups of four;

e.g.,

2 groups of four =



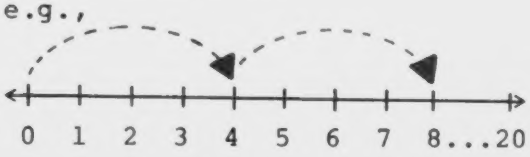
2.04.04.02A count by fours through 20;

e.g.,

1 group of four = 4
2 groups of four = 8
3 groups of four = 12

2.04.04.03A use a number line to demonstrate counting by fours through 20;

e.g.,

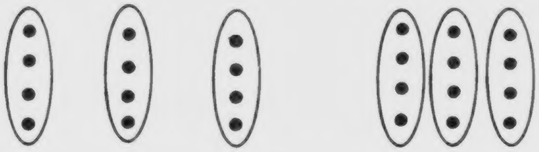


1 group of four = 4
2 groups of fours = 8

2.04.04.04A demonstrate that multiplication is the process of repeated addition of like addends.

e.g.,

4 + 4 + 4 = 3 groups of 4
= 3 x 4



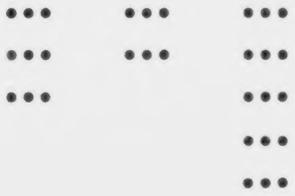
2.04.04

VOCABULARY

TERMS	SYMBOLS
multiplication	x
array	

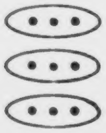
GETTING STARTED

Display several arrays for multiplication by three.
e.g.,



Ask a student to find the array which shows 3 x 3 and write the number sentence 3 x 3 = 9 above it. Ask another student to ring each group of three.
e.g.,

3 x 3 = 9



Repeat this procedure using the other arrays.

Ask two students to stand together. Write 1 x 2 = 2 on the chalkboard. Ask two more students to stand together and write 2 x 2 = 4 on the chalkboard. Continue asking two students at a time to stand together until there are five pairs of students standing and 1 x 2 = 2, 2 x 2 = 4, 3 x 2 = 6, 4 x 2 = 8 and 5 x 2 = 10 is written on the chalkboard.

2.04.04

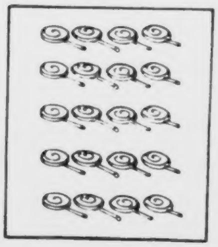
2.04.04.01 **show groups of four through 5 groups of four**

STRATEGY 1: Prepare and display a picture of a chicken. Distribute an egg carton and counters to each student or group of students. Say, "Charlie the Chicken makes sure his 2 younger brothers and 3 younger sisters get their dinner of 4 beans each. How many chicks must he feed? (He must feed 5 chicks.) Place four beans in each of five sections of your egg carton. How many groups of four does Charlie have? (Charlie has five groups of four.)

Repeat this procedure with one, two, three, and four groups of four.

STRATEGY 2: Prepare and display a chart of 20 lollipops.

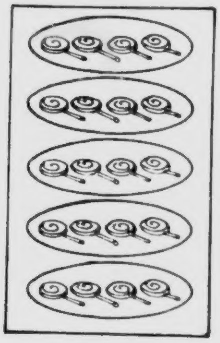
e.g.,



Say, "Mr. Smith owns a candy store. He sells lollipops in groups of four. Who can circle groups of four lollipops to help Mr. Smith prepare his candy? How many groups of four did you circle? (5) How many lollipops in all?" (There are 20 lollipops in all.) Write the students' responses near the display.

e.g.,

20 lollipops =
5 groups of 4



STRATEGY 2: cont'd

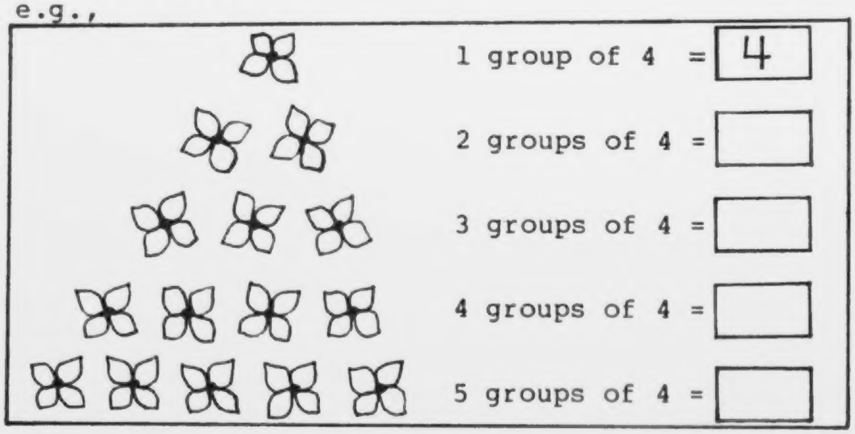
Say, "Now draw eight lollipops in your notebook. "Circle groups of four. How many groups of four are circled? (2) How many lollipops in all?" (8) Write on the chalkboard: 8 lollipops =
2 groups of 4

Repeat this procedure for all the groups of 4 through 5 groups of four.

2.04.04.02 count by fours through 20

STRATEGY 1: Prepare and display a chart of 15 flowers, each with 4 petals.

e.g.,



Say, "My garden has many flowers. Each flower has four petals. How many flower petals does each row in my garden have?" Complete the chart as the students respond. After the chart is completed, ask the students to read the number sentences in sequence and then to count by fours through 20, e.g., 4, 8, 12,...,20.

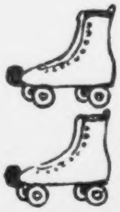
STRATEGY 2: Prepare pictures of five roller skates. Say, "Tommy works at the New Roller Derby. Every night

STRATEGY 2: cont'd

Tommy collects a large bag of old roller skates. He has to count the skates and bring them to the manager. One night the manager asked Tommy how many wheels he had in his bag. Tommy looked very puzzled. He counted the skates. There were five skates, but he wasn't sure how many wheels there were. Let's see if we can help him."

Display a picture of one roller skate. Say, "One skate has how many wheels?" (1 group of four = 4) Place a second picture of a skate under the first picture. Say, "Two skates have how many wheels?" (2 groups of four = 8).

e.g.,



1 group of four = 4

2 groups of four = 8

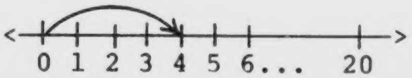
Repeat this procedure for all five roller skate pictures. Record your results on the chalkboard.

Ask the students to count by fours using desk legs, chair legs, and desk corners.

2.04.04.03 **use a number line to demonstrate counting by fours through 20**

STRATEGY 1: Prepare and display a 0 through 20 number line with an arrow from 0 to 4.

e.g.,

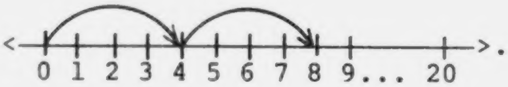


Say, "How many spaces are there from 0 to 4? (4) One group of four equals 4." Ask a student to come

STRATEGY 1: cont'd

to the chalkboard and show another group of four.

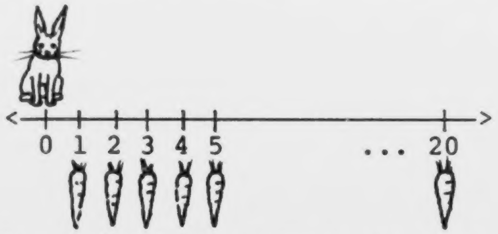
e.g.,



Say, "Where is the point of the second arrow? (8) How many groups are there? (2) What does our number line show?" (2 groups of four = 8.) Write 2 groups of four = 8 on the chalkboard. Repeat this procedure through 5 groups of four = 20. When the groupings on the number line have been completed, ask the students to say what each grouping means, e.g., 1 group of four = 4, 2 groups of four = 8, ... 5 groups of four = 20.

STRATEGY 2: Prepare and display a 0 through 20 number line. Tape a picture of a rabbit to the number line.

e.g.,



Say, "Our friend Mr. Jumper is very hungry. He would like to eat some carrots. Let's help Mr. Jumper find carrots. Mr. Jumper will start at 0. Each time he jumps he will get four carrots." (Demonstrate by drawing an arrow from 0 to 4.) Write 1 group of four = 4 on the chalkboard. Draw another arrow on the number line and say, "How many jumps, did Mr. Jumper make? (Mr. Jumper made 2 jumps.) How many carrots did he find?" (Mr. Jumper found 8 carrots.) Explain. (2 fours = 8) Write 2 groups of four = 8 on the chalkboard. Ask various students to demonstrate 3, 4, and 5 jumps on the

STRATEGY 2: cont'd

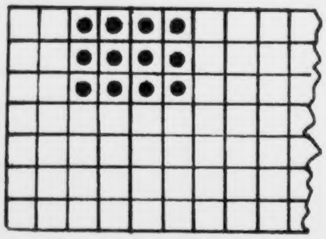
number line. For each jump say, "How many jumps did Mr. Jumper make? How many carrots did he find?" Write each grouping on the chalkboard.

Repeat this procedure until all the students have had a turn.

2.04.04.04 **demonstrate that multiplication is the process of repeated addition of like addends**

STRATEGY 1: Prepare and distribute graph paper and crayons to each student. Tape 1-inch graph paper to the chalkboard. Say, "We will draw some patterns." Draw one dot in each of four squares on the graph paper and ask the students to do the same. Draw two more rows of four dots and ask the students to do the same.

e.g.,



Say, "How many rows of dots did we draw? (We drew 3 rows of dots.) How many dots are in each row? (There are 4 dots in each row.) We can add the number of dots in each row to find the number of dots in all." Write on the chalkboard:

4 + 4 + 4 =
3 groups of 4 =
3 x 4 =
12

(Note: The 3 must be written first because there are 3 groups of 4.) Say, "This picture of dots is called an array."

STRATEGY 1: cont'd

Repeat this procedure with arrays for 1 x 4, 2 x 4, 4 x 4, and 5 x 4.

STRATEGY 2:

Prepare and display a flannel board, 20 felt apples, and five basket cutouts. Place one basket with four apples on the flannel board. Say, "One basket has 4 apples." Place another basket with 4 apples next to it. Say, "There are two baskets with four apples in each basket. We can find out how many apples there are in both baskets by adding, 4 + 4 = 8. We can also multiply. Write on the chalkboard:

4 + 4 =
2 groups of 4 =
2 x 4 =
8

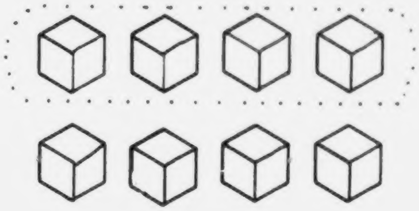
Repeat this procedure for the third, fourth, and fifth baskets.

Say, "We can find out how many apples we have by adding or by multiplying because we have the same number of apples in each basket."

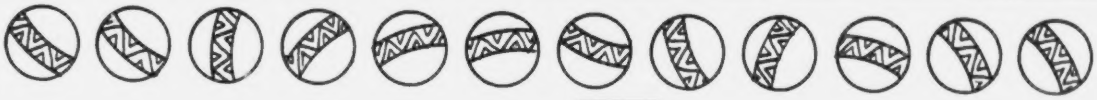
P.O. 2.04.04.01

NAME:____________________ CLASS:________ DATE:________

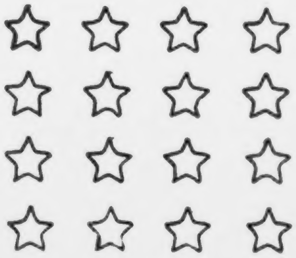
Circle groups of four.
Write the numeral that shows how many groups of four you circled.



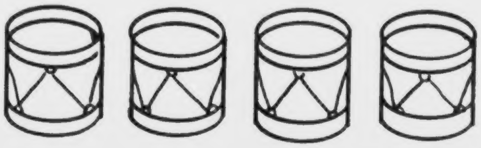
2 groups of 4



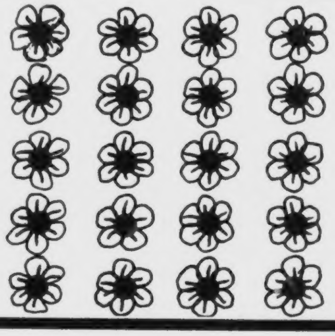
☐ groups of 4



☐ groups of 4



☐ group of 4

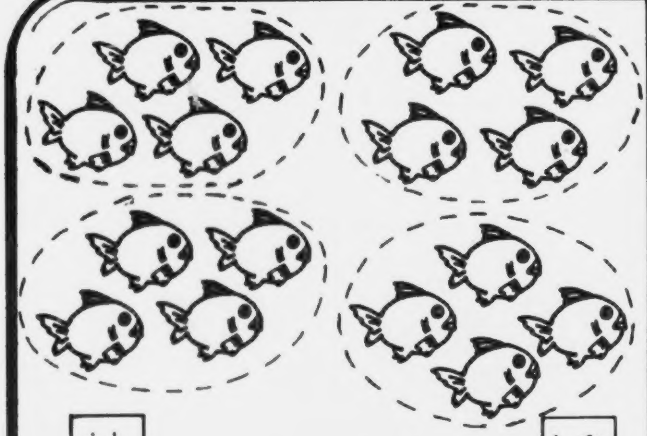


☐ groups of 4

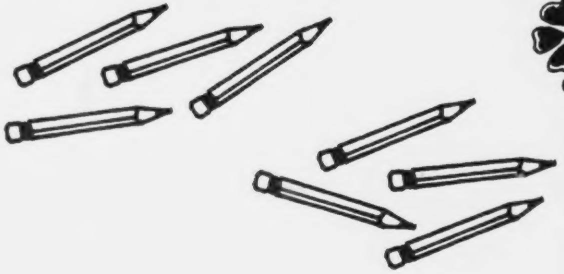
P.O. 2.04.04.02

NAME: ____________________ CLASS: ________ DATE: ________

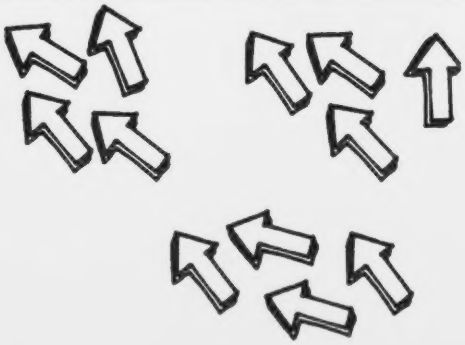
Circle each group of four.
Tell how many in all.



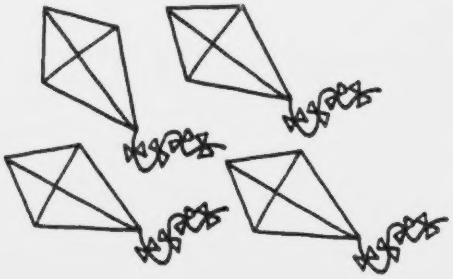
4 groups of four = 16



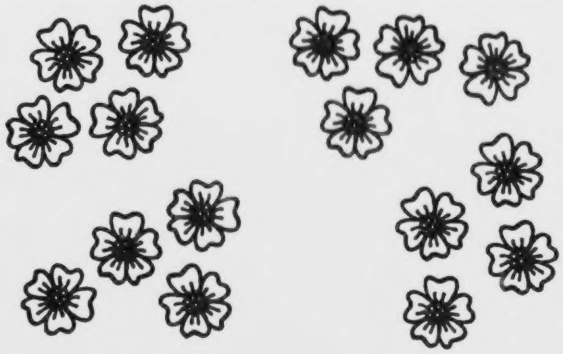
☐ groups of four = ☐



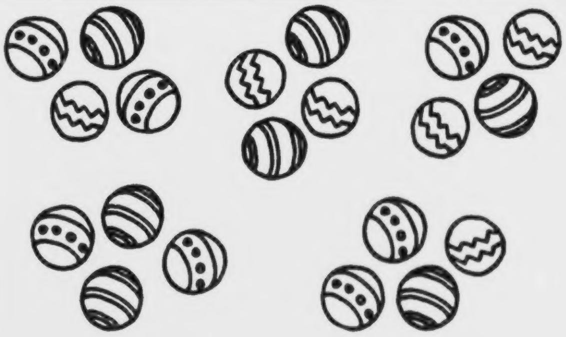
☐ groups of four = ☐



☐ group of four = ☐



☐ groups of four = ☐

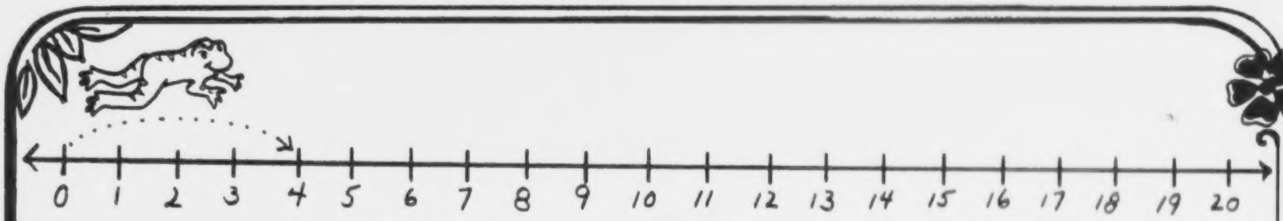


☐ groups of four = ☐

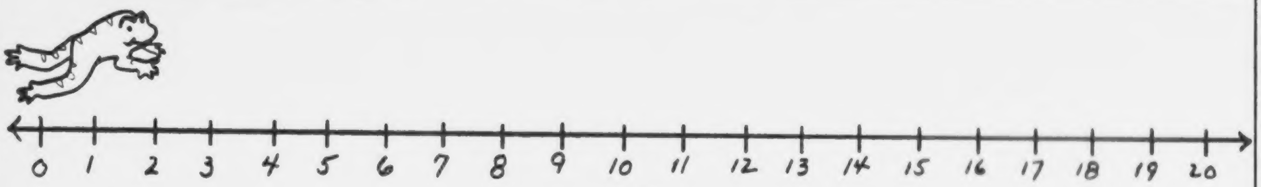
P.O. 2.04.04.03

NAME: ____________________ CLASS: __________ DATE: __________

Froggie hops four spaces each time he jumps.
Draw arrows to show the jumps.


0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

1 group of four = ☐


0
1
2
3
4
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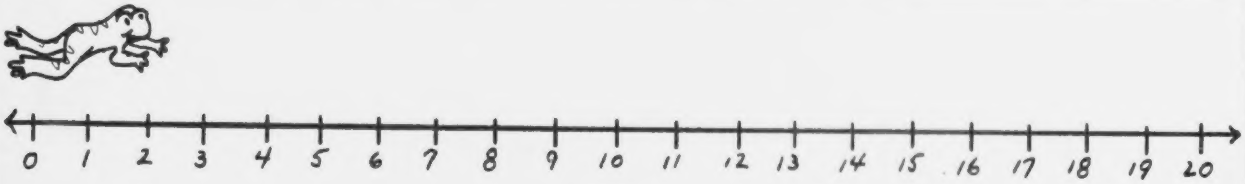
16
17
18
19
20

2 groups of four = ☐


0
1
2
3
4
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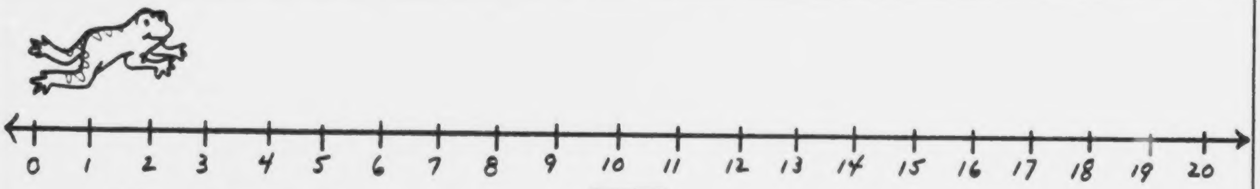
16
17
18
19
20

3 groups of four = ☐


0
1
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3
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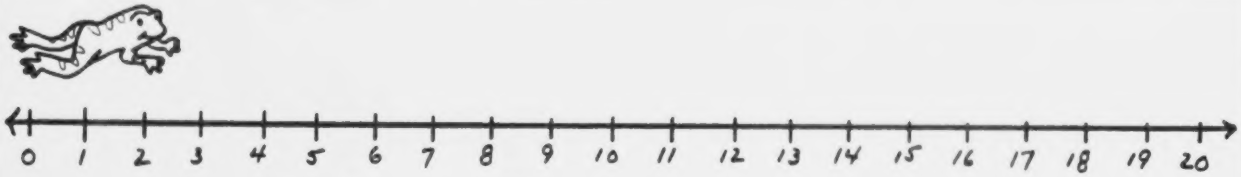
13
14
15
16
17
18
19
20

4 groups of four = ☐


0
1
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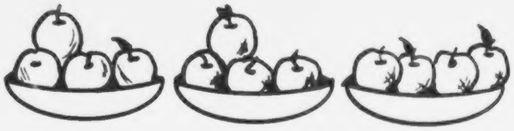
11
12
13
14
15
16
17
18
19
20

5 groups of four = ☐

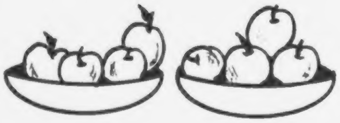
P.O. 2.04.04.04

NAME:______________________ CLASS:__________ DATE:________

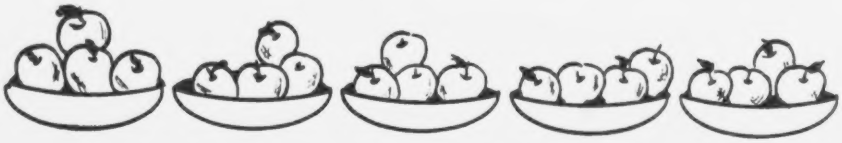
Count the apples.
Complete the addition and multiplication.



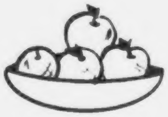
4 + 4 + 4 = 3 x 4 = 12



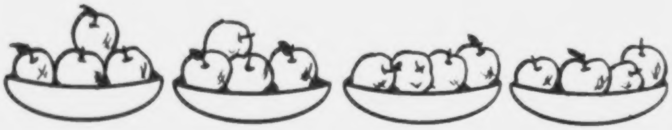
___ + ___ = ___ x 4 = ___



___ + ___ + ___ + ___ + ___ = ___ x 4 = ___



___ = ___ x 4 = ___



___ + ___ + ___ + ___ = ___ x 4 = ___

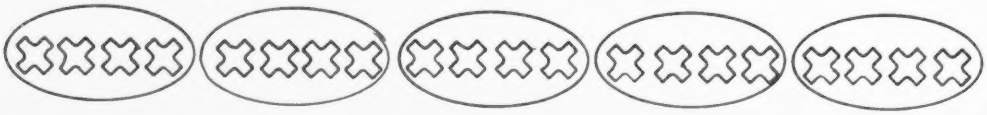
2.05.05 DIVISION FACTS FOR FOURS THROUGH 20

(1-2 lessons)

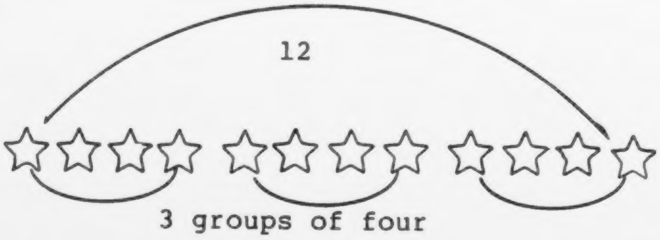
PERFORMANCE OBJECTIVES

The student will be able to...

2.05.05.01A separate up to 20 objects into groups of four, without a remainder;
e.g.,



2.05.05.02B identify the number for a given set through 20 and tell how many groups of four are in that set;
e.g.,



2.05.05.03B solve story problems related to skills learned in this module.
e.g.,

There are 12 eggs in a box. Mary puts 4 on each plate. How many plates does she need?

2.05.05

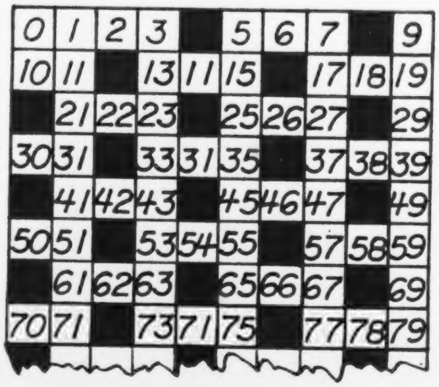
VOCABULARY

TERMS	SYMBOLS
division	÷
divide	

GETTING STARTED

Prepare and distribute a hundreds chart to each student. Say, "Color the 0. Count by four. Color the box for each number counted. What numbers did you color?" (4, 8, 12...)

e.g.,



0	1	2	3	■	5	6	7	■	9
10	11	■	13	14	15	■	17	18	19
■	21	22	23	■	25	26	27	■	29
30	31	■	33	34	35	■	37	38	39
■	41	42	43	■	45	46	47	■	49
50	51	■	53	54	55	■	57	58	59
■	61	62	63	■	65	66	67	■	69
70	71	■	73	74	75	■	77	78	79
■				■				■	

Prepare and distribute number cards in multiples of four from 4 through 40. Ask the students with the cards to stand and scatter themselves around the room while displaying their cards.

Ask the student holding number 4 to also hold the end of a ball of yarn. Say, "We will count by four." Unravel the yarn so the student holding card number 8 is now holding the ball of yarn. Unravel the yarn again until you reach the student holding card number 12. Continue giving the yarn to the remaining students to hold. Make sure that the ball of yarn has been distributed around in correct counting order.

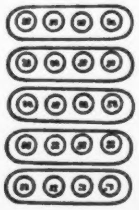
When a student holding a number is holding the yarn, ask him/her to count by fours in the order in which they were joined. Repeat this procedure until each student has had a chance to participate.

2.05.05

2.05.05.01 **separate up to 20 objects into groups of four, without a remainder**

STRATEGY 1: Prepare and distribute cups containing 4, 8, 12, 16, or 20 buttons (chips or beans) to each group of students. Say, "Group one, you have 20 buttons in your cup. Separate your buttons into groups of 4. How many groups of four did you make?" (We made 5 groups of four from the 20 buttons.) Draw a sketch of the contents on the chalkboard. Say, "Who can circle the buttons to show groups of four? How many groups did you circle?" Accept any method for encircling the groups of 4. Write the response beneath the diagram.

e.g.,



20 buttons = 5 groups of 4

Repeat this procedure with the other groups until all the objects have been separated into groups of 4.

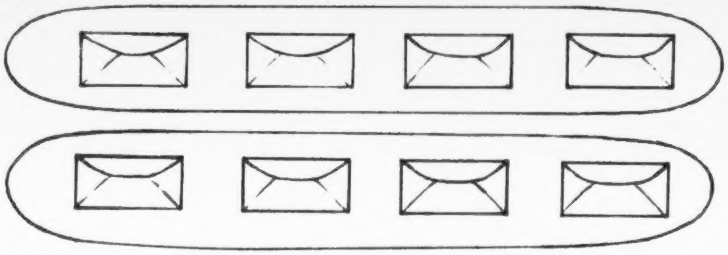
STRATEGY 2: Prepare and display 8 envelopes on the chalkboard ledge. Say, "Today we will visit the post office. We will help deliver the mail. There are 8 envelopes in our first sack, but the mailman will only deliver the envelopes in groups of four. Who can separate the envelopes into groups of four? How many groups of four did you make?" (We made 2 groups of four from the 8 envelopes.)

Sketch the 8 envelopes on the chalkboard. Say, "Who can circle groups of 4 envelopes? How many

STRATEGY 2: cont'd

groups of 4 are in 8?" (2) Record the correct response.

e.g.,



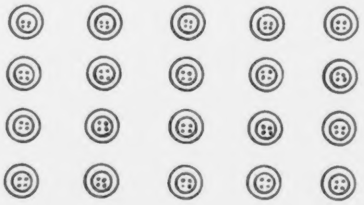
8 envelopes = 2 groups of four

Repeat this procedure for 20, 16,12, and 4 envelopes.

2.05.05.02 **identify the number for a given set through 20 and tell how many groups of four are in that set**

STRATEGY 1: Prepare 5 envelopes with the following items: 20 buttons, 16 beans, 12 chips, 8 sticks, 4 pencils. (Other objects may be substituted.) Divide the class into groups. Give each group one of the envelopes. Ask the first group to remove the contents of the envelope. Say, "Let's count aloud as the items are removed. How many items were removed? Draw a diagram of the contents on the chalkboard."

e.g.,



Say, "Now separate your items into groups of four. How many groups of four do you have?" After the correct response is given ask the students to

STRATEGY 1: cont'd

circle groups of four on the chalkboard diagram. Say, "With how many did we begin? How many groups did we make?" Write the response beneath the diagram, e.g., 16 buttons in all, 5 groups of 4.

Repeat this procedure using the remaining four envelopes.

STRATEGY 2: Prepare and distribute bundles of 20 straws to each student or group of students. Say, "Count the straws. Separate your straws into piles by putting four straws in each pile. How many piles do you have? (5) Take away one pile. How many straws are left?" (16) Continue subtracting piles of straws, one pile at a time, until there are no straws left. Say, "With how many straws did we begin? (We began with 20 straws.) How many straws did we take away each time? (We took 4 straws away each time.) How many piles of straws did we take away?" (We took 5 piles of 4 straws from the 20.)

Repeat this procedure, separating sixteen straws into four piles, twelve straws into three piles, eight straws into two piles, and four straws into one pile.

2.05.05.03 solve story problems related to skills learned in this module

STRATEGY 1: Propose the following problem as you write it on the chalkboard.

> At the aquarium twelve goldfish will be placed in fishbowls. Each bowl can hold four fish. How many fishbowls are needed?

Say, "How can we decide how many fishbowls we will need?" (We can separate the fish into fishbowls by

STRATEGY 1: cont'd

groups of four.) Draw twelve fish on the chalkboard. Ask a student to draw circles around groups of four fish. Elicit that three fishbowls are needed. Write on the chalkboard: Three fishbowls each having 4 fish are needed.

Repeat this procedure using other story problems.

STRATEGY 2:

Prepare several sets of discs with 20 discs in each set. Say and write on the chalkboard: "Mother baked 20 cookies. She wants to give them to some children. If each child gets four cookies, how many children can mother feed?"

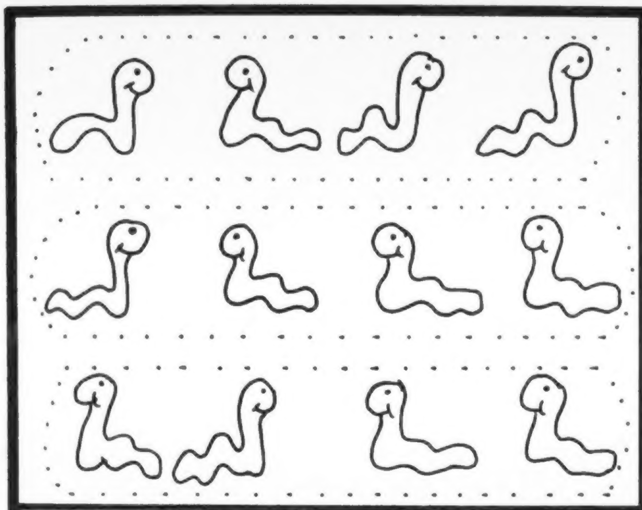
Distribute 20 discs to each student or group of students. Say, "How many discs are there?" (There are 20 discs.) Let's subtract piles of 4 until no discs remain. "With how many discs did we start? (We started with 20 discs.) How many discs were in each group? (There were 4 discs in each group.) How many groups did we have? (We had 5 groups of 4 discs.) How many children can Mother feed? (Mother can feed 5 children.) Write on the chalkboard: Mother can feed 5 children.

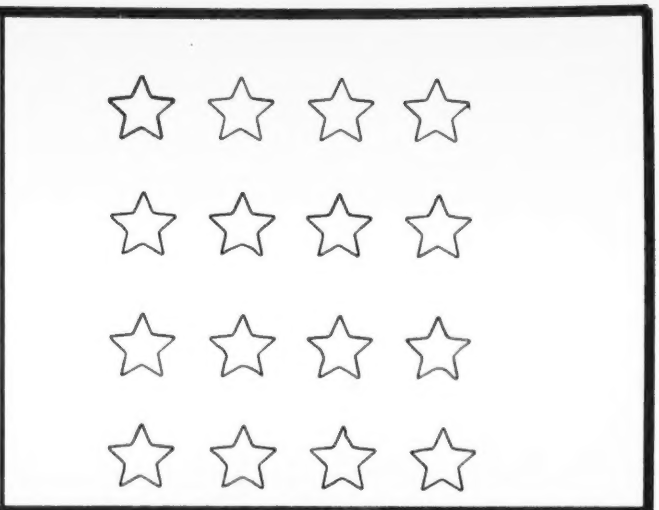
Repeat this procedure using other story problems.

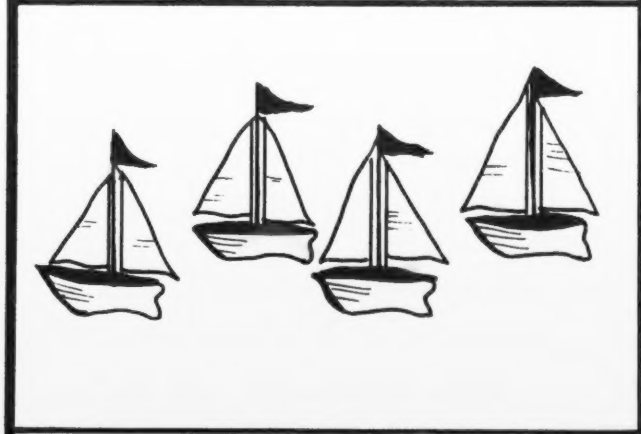
P.O. 2.05.05.01

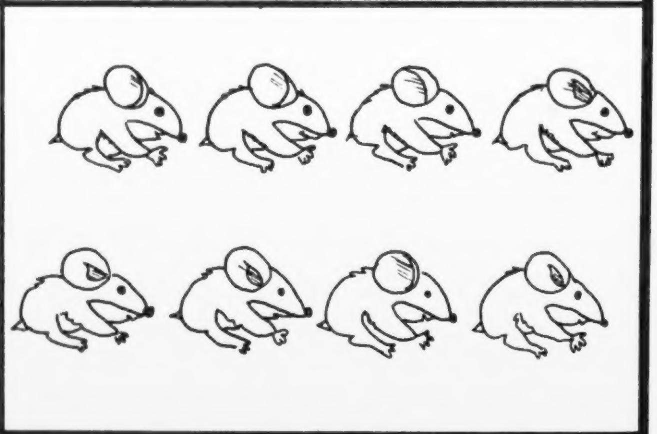
NAME:____________________ CLASS:________ DATE:________

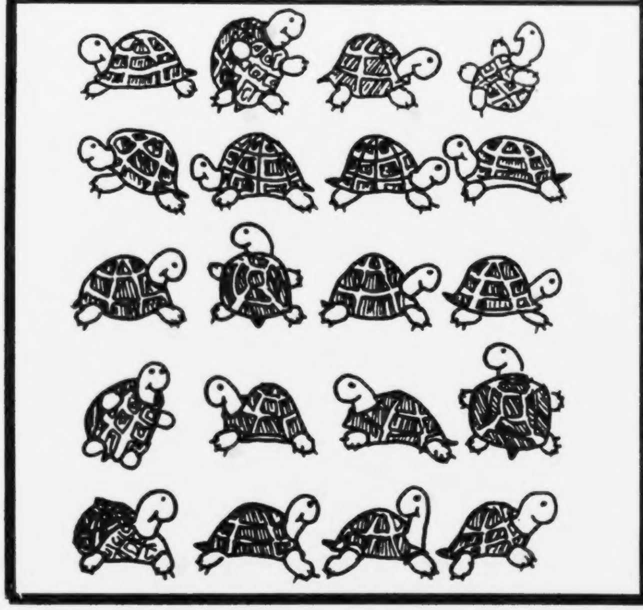
Draw a ring around groups of four in each box.

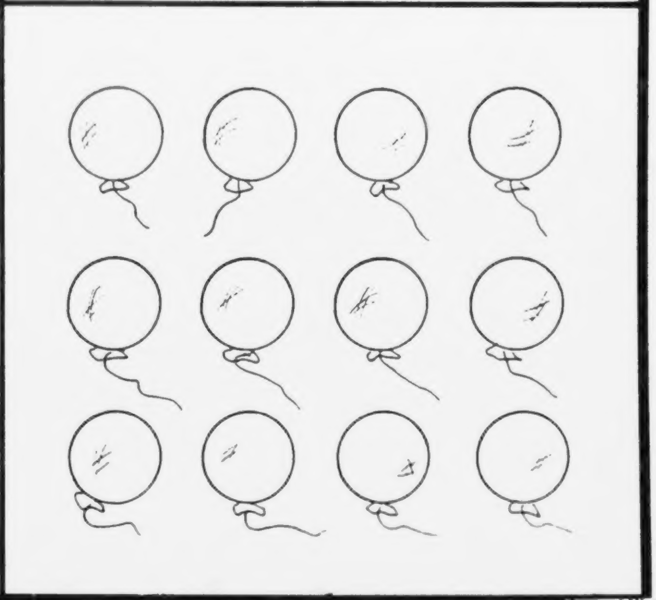








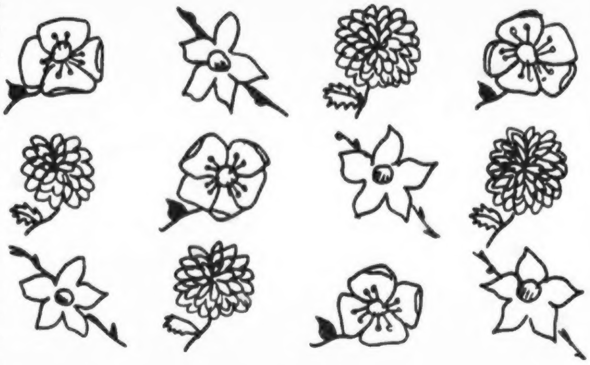




P.O. 2.05.05.02

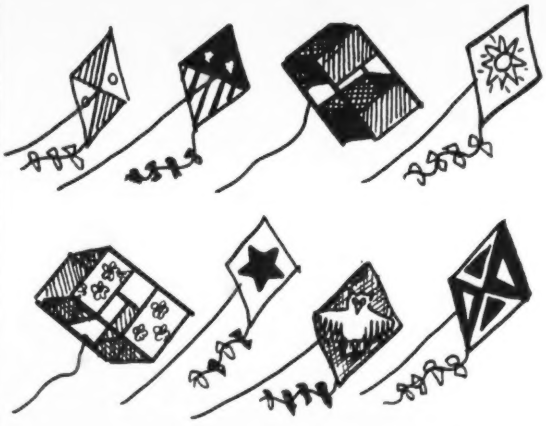
NAME: ________________________ CLASS: __________ DATE: ________

Draw a ring around groups of four.
Complete each sentence.



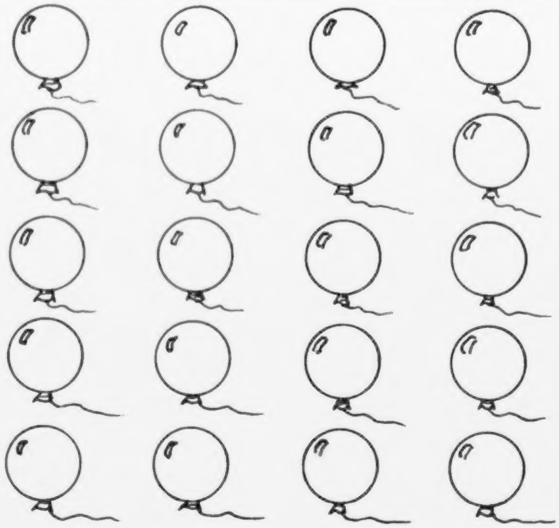
_______ flowers in all.

_______ groups of 4.



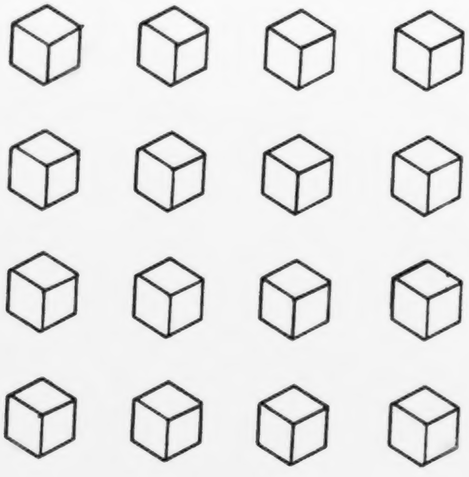
_______ kites in all.

_______ groups of 4.



_______ balloons in all.

_______ groups of 4.



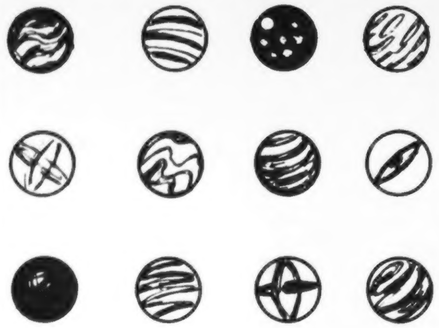
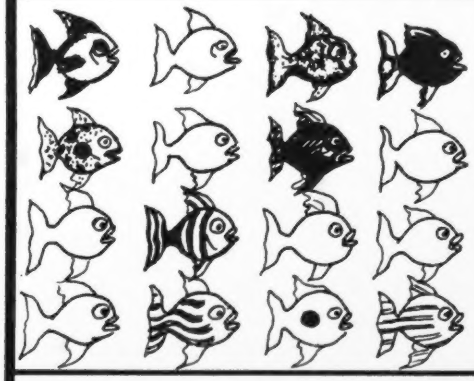
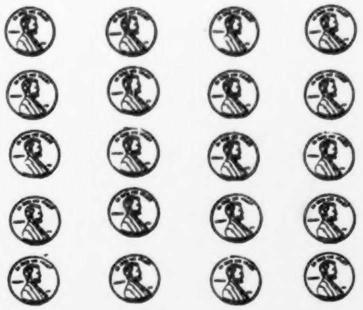
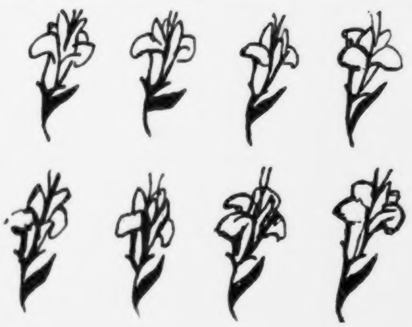
_______ boxes in all.

_______ groups of 4.

P.O. 2.05.05.03

NAME:______________________ CLASS:________ DATE:________

Read and solve each problem.

	Pam has 12 marbles. She will give 4 to each friend. How many friends will get marbles? _______ friends
	Mrs. Berg wants to buy 16 pet fish and some fish bowls. She will place 4 fish in each bowl. How many bowls does she need? _______ bowls
	Kate has 20 pennies. She will place 4 in each pile. How many piles can she make? _______ piles
	Anita will place 4 flowers in each vase. If she has 8 flowers, how many vases will she need? _______ vases

2.06.02 IDENTIFY FRACTIONAL PARTS OF A GROUP

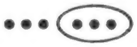
$(\frac{1}{2}, \frac{1}{3}, \frac{1}{4})$

(1-2 lessons)

PERFORMANCE OBJECTIVES

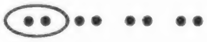
The student will be able to...

2.06.02.01A separate a group through 10 objects into two equal groups using fractional parts;
e.g.,



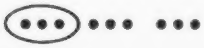
one-half of six

2.06.02.02A separate a group through 20 objects into four equal groups using fractional parts;
e.g.,



one-fourth of eight

2.06.02.03A separate a group through 15 objects into three equal groups using fractional parts;
e.g.,



one-third of nine

2.06.02.04A solve story problems related to skills learned in this module.
e.g.,

> Jose and Juan went trick-or-treating on Halloween. They received 6 boxes of raisins. They shared their treats equally. What fractional part did Juan receive?

2.06.02

VOCABULARY

TERMS

equal
one-half
one-third
one-fourth

GETTING STARTED

Distribute a box of 12 paper shapes (3 circles, 3 squares, 3 triangles, and 3 rectangles) to each group of students. Say, "Separate the shapes so that the same shapes are together. Place the piles in the center of your table. How many piles are there? (4) How many shapes are in each pile? (3) Does each pile have an equal number of shapes?" (Yes)

Draw 2 large circles on the chalkboard. Prepare tape and a box containing 5 red and 5 blue discs. Say, "I want to separate these discs by color. Let's tape the red discs inside one circle and the blue discs inside the other circle." Ask the students, one at a time, to place a disc in the appropriate circle. Say, "How many discs did we have in the box? (10). Into how many groups did we separate them? (2) How many discs are in the red group? (5) How many discs are in the blue group? (5) Are the groups equal?" (Yes)

2.06.02

2.06.02.01 **separate a group, through 10 objects, into two equal groups using fractional parts**

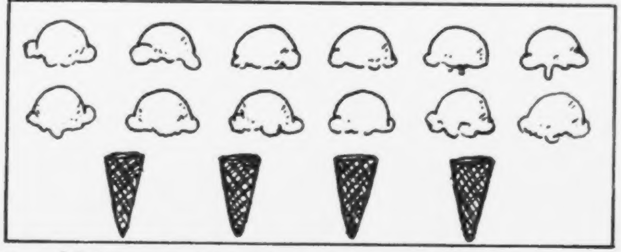
STRATEGY 1: Prepare and display a flannel board with fruit cutouts, e.g., 6 apples. Ask two students to share the apple cutouts equally. Say, "With how many apples did we start? (6) How many apples did each student get? (3) Did they share the apples equally? (yes) Each student got one-half of the total number of apples. When a number of objects are separated into two equal groups, one-half of the objects are in each group. One-half of six apples is three apples." Write on the chalkboard: One-half of six apples is three apples.

Repeat this procedure using other even numbered flannel cutouts through 10 objects.

2.06.02.02 **separate a group through 20 objects into four equal groups using fractional parts**

STRATEGY 1: Prepare and display a flannel board and cutouts of 4 cones and 12 scoops of ice cream.

e.g.,



Say, "We will use these cones and scoops of ice cream to make super ice cream cones. How many cones are displayed? (4) How many ice cream scoops are displayed? (12) Let's place scoops of ice cream on each cone so that all the scoops are used and each cone has an equal number of ice cream scoops." Ask a student to place one scoop of ice cream on each cone. Ask another student to do the same.

STRATEGY 1: cont'd

Repeat this procedure until each cone has 3 scoops of ice cream. Say, "How many scoops does each cone have? (3) Into how many groups have the scoops been separated? (4) Each cone has three of the scoops. Three is one-fourth of twelve. Point to each cone and say, "One-fourth of all the scoops is on the first cone, one-fourth of all the scoops is on the second cone, one-fourth of all the scoops is on the third cone and one-fourth of all the scoops is on the fourth cone." Write on the chalkboard: One-fourth of twelve scoops of ice cream is 3 scoops of ice cream.

Repeat this procedure, separating a group, through 20 objects into four equal groups.

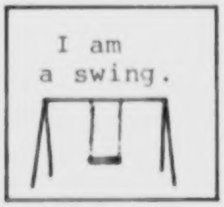
2.06.02.03 **separate a group, through 15 objects, into three equal groups using fractional parts**

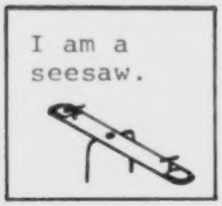
STRATEGY 1: Adapt Strategy 1, P.O. 2.06.02.01 or Strategy 1, P.O. 2.06.02.02

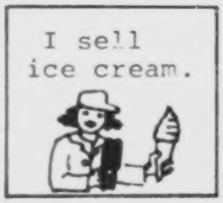
2.06.02.04 **solve story problems related to skills learned in this module**

STRATEGY 1: Prepare three signs.

e.g.,







Write a word problem on the chalkboard.

e.g.,

Twelve children went to the playground. They separated into

STRATEGY 1:
cont'd

three equal groups. One group went to the swings, one group went to the see-saw, and one group went to buy ice cream. How many children were in each group? What fractional part of the 12 children were in each group?

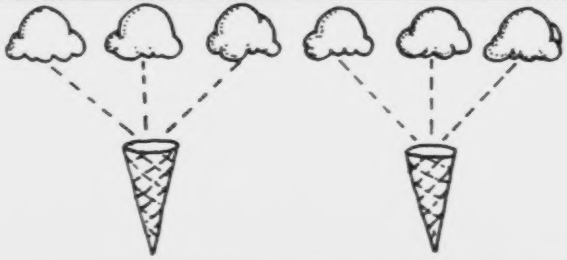
Give one sign to each of three students. Select 12 students. Ask them to separate into 3 equal groups. Point to one group and say, "You like the swings. Stand behind the student wearing the sign that says, 'I am a swing.'" Repeat this procedure for the other two groups. Say, "How many students went to the playground? (12) How many students went to the swings? (4)...to the see-saw? (4)... to buy ice cream? (4) How many groups are there? (There are 3 groups.) If 12 students went to the playground and divided equally into 3 groups, we can say four is one-third of twelve."

Repeat this procedure using similar problems for separating groups through 10 objects into two equal groups and for separating groups through 20 objects into four equal groups.

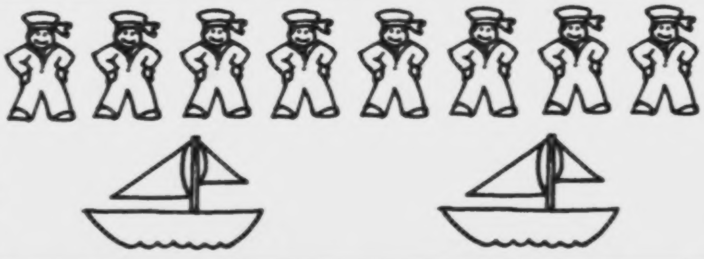
P.O. 2.06.02.01

NAME: ______________________ CLASS: ________ DATE: ________

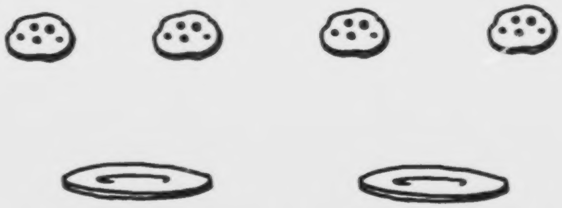
Draw lines to show how each group is divided in half.
Complete each statement.



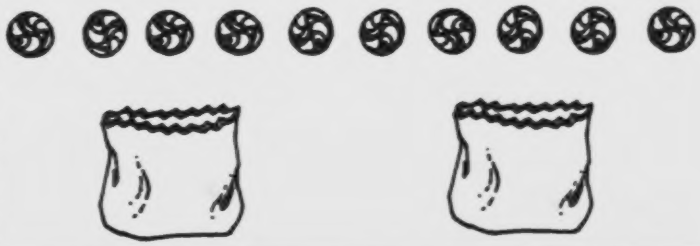
There are 3 scoops
for each cone.
One-half of 6 is 3.



There are ☐ people
for each boat.
One-half of 8 is ☐.



There are ☐ cookies
for each plate.
One-half of 4 is ☐.



There are ☐ marbles
for each bag.
One-half of 10 is ☐.

DO YOU REMEMBER?

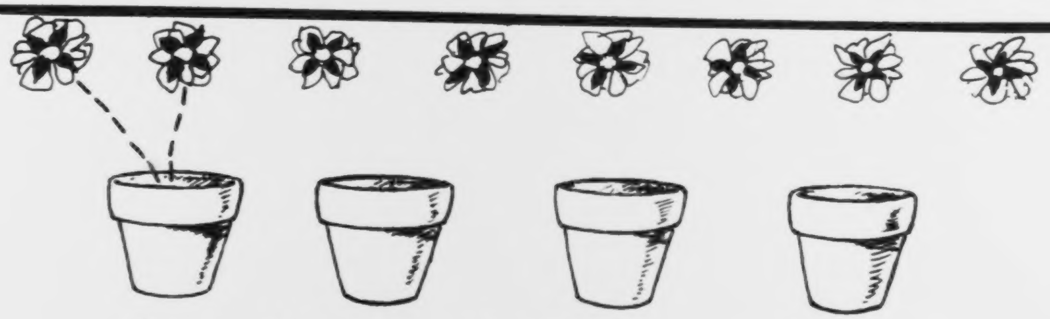
Mr. Lee has 15 balloons.
His 5 children will share them equally.
How many balloons will each child receive?

______ balloons

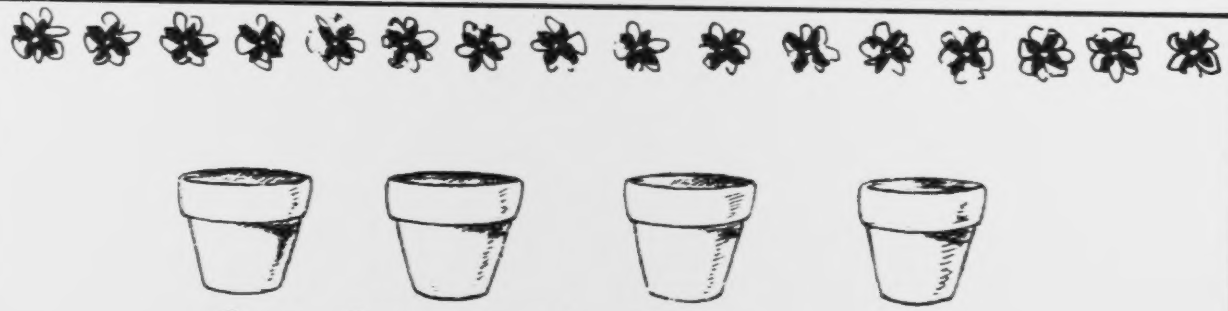
P.O. 2.06.02.02

NAME: ______________________ CLASS: __________ DATE: ________

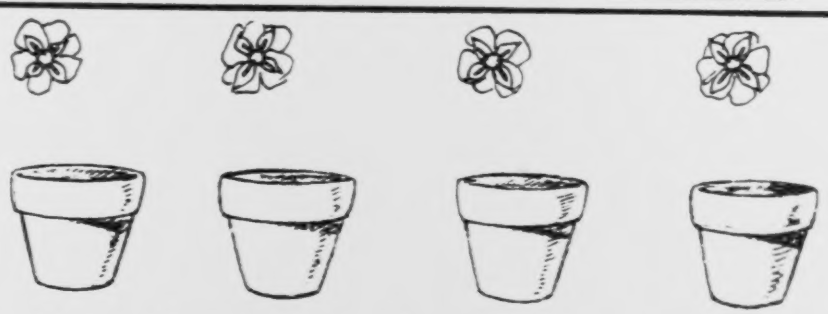
Place an equal number of flowers in each flower pot by drawing lines from the flowers to the flower pots. Complete each sentence.



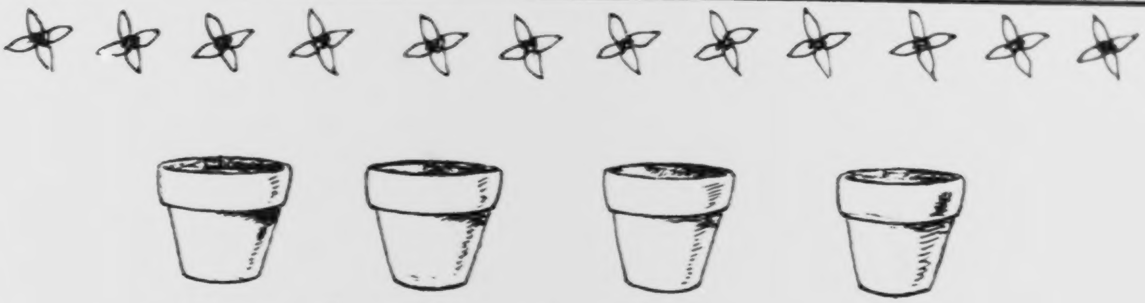
One-fourth of 8 is 2.



One-fourth of 16 is _____.



One-fourth of 4 is _____.

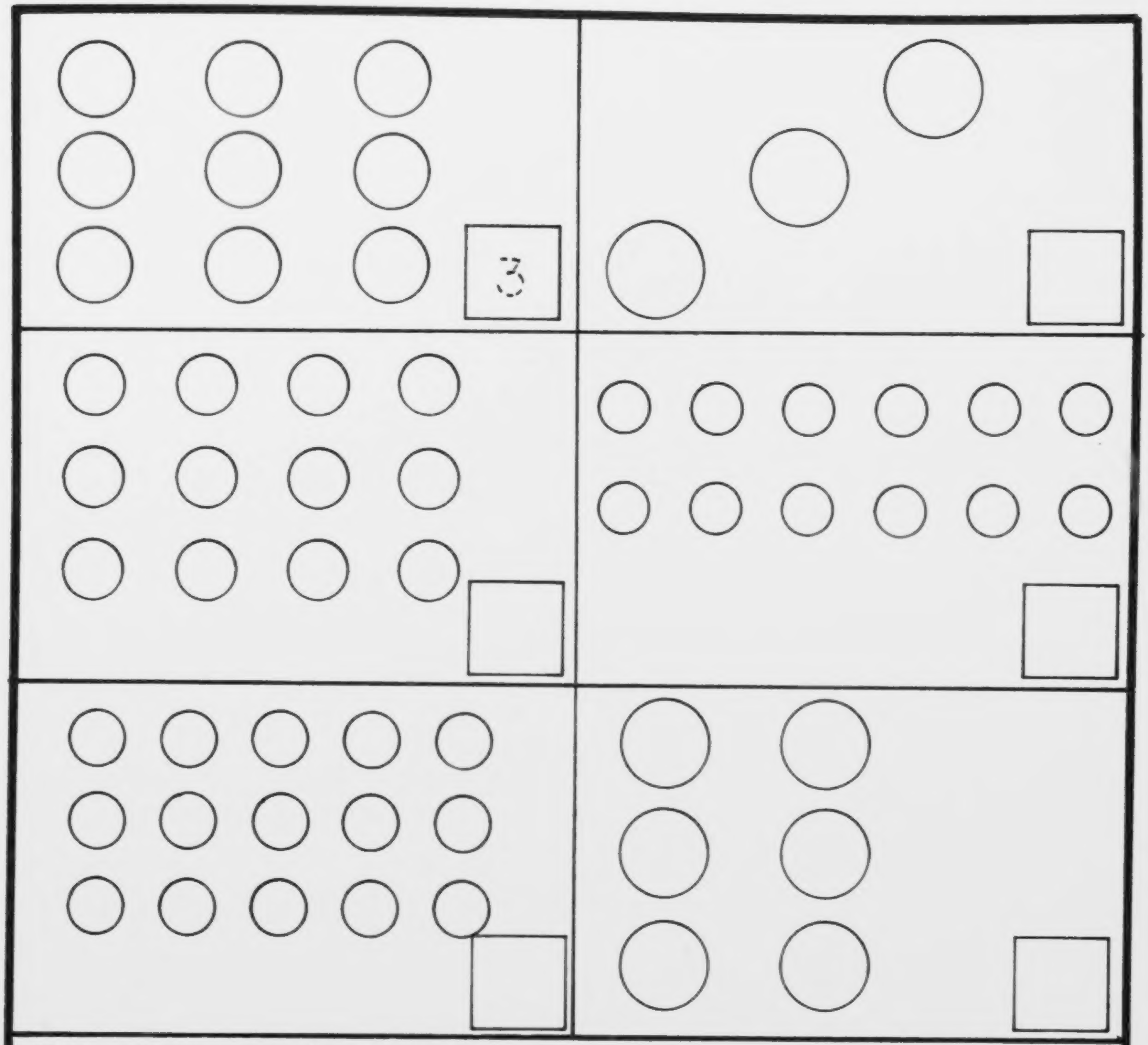


One-fourth of 12 is _____.

P.O. 2.06.02.03

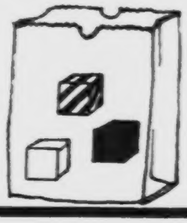
NAME: ______________________________ CLASS: ________ DATE: ________

In each box, color one-third of all the circles red, one-third blue, and one-third yellow. How many of each are red, blue, or yellow? Write the numeral in the box.



DO YOU REMEMBER?

If you pick a block out of the bag without looking, what is the chance of picking the shaded block?



______ out of ______

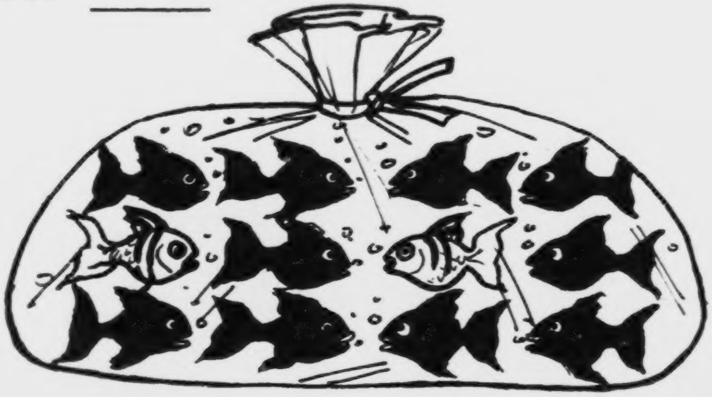
P.O. 2.06.02.04

NAME: ______________________ CLASS: ________ DATE: _______

Read each story problem. Answer the questions.

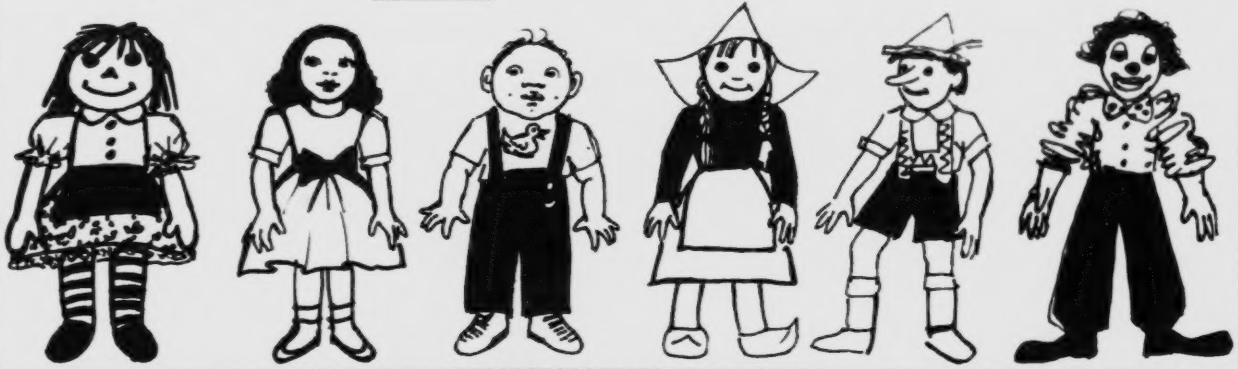
Bob, Bill, and Ben went to the pet shop to buy fish.
The clerk put 12 fish in one bag.
The boys shared the fish equally.

1. How many fish did each boy get? _____
2. What fractional part of the 12 fish did each boy get? _____



Janet and Sue went shopping.
They bought 6 dolls.
When they got home they divided the dolls equally.

1. How many dolls did Janet get? _____
2. How many dolls did Sue get? _____
3. What fractional part of the 6 dolls did each girl get? _____



Unit 56

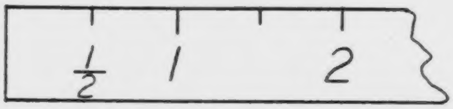
2.10.10 LINEAR MEASUREMENT - HALF INCH

(1 lesson)

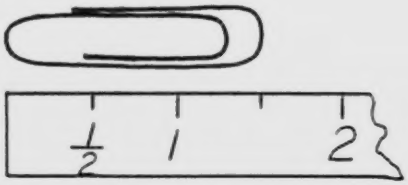
PERFORMANCE OBJECTIVES

The student will be able to...

2.10.10.01C identify $\frac{1}{2}$ inch on the 12 inch ruler; e.g.,



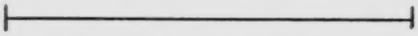
2.10.10.02C measure and record the lengths of objects to the nearest $\frac{1}{2}$ inch; e.g.,



How long is the paper clip?

Note: Objects to be measured should not exceed 12 inches.

2.10.10.03C measure and record the lengths of line segments to the nearest $\frac{1}{2}$ inch. e.g.,



How long is the line segment?

2.10.10

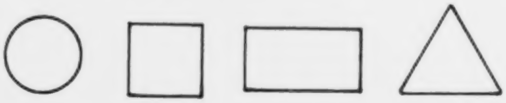
VOCABULARY

TERMS	**SYMBOL**
half inch	$\frac{1}{2}''$

GETTING STARTED

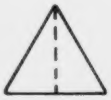
Draw several shapes on the chalkboard.

e.g.,



Ask the students to identify each shape. Then ask a student to come to the chalkboard and divide one of the shapes into two equal parts.

e.g.,

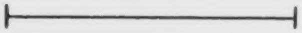


Say, "What do we call each part?" (one-half) Ask another student to write the fractional number ($\frac{1}{2}$) in each part.
Repeat this procedure with the remaining shapes.

Prepare and distribute rulers and drawing paper to each student or group of students. Say, "Today we are going to draw some lines. What can we use to help us draw straight lines? (A ruler is used to draw straight lines.) How may these lines be measured?" (Lines may be measured in inches.) Ask the students to draw several lines, e.g., 4 inches, 2 inches, 6 inches. Be sure each line is labeled appropriately.

e.g.,

The length of the line is 2 inches.



2.10.10

2.10.10.01 **identify $\frac{1}{2}$ inch on the 12 inch ruler**

STRATEGY 1: Prepare a large diagram of a 12 inch ruler with $\frac{1}{2}$ inch markings and a set of 12 inch rulers calibrated in half inches. Display the diagram of the ruler. Say, "What does this diagram show? (a ruler) Why do we use a ruler? (A ruler is used to measure or to draw straight lines.) What do the numbers on the ruler tell us? (The numbers on the rulers tell us the number of inches.) What do the long lines on the ruler means? (The long lines on the ruler tell us each inch.) There are also short lines between the inches. They are half way between the inch lines. They each represent a half inch because they divide each inch into two equal parts. We call each part $\frac{1}{2}$ inch." Ask several students to point to the half inch markings along the ruler as they identify the measure.

Distribute a 12 inch ruler to each student and repeat this procedure having the students identify the $\frac{1}{2}$ inch markings on their own rulers.

2.10.10.02 **measure and record the lengths of objects to the nearest $\frac{1}{2}$ inch**

STRATEGY 1: Prepare and distribute 12 inch rulers with $\frac{1}{2}$ inch markings to each student or group of students. Write the names of various objects to be measured on the chalkboard, e.g., pencil, notebook, mathematics book, crayon.

Say, "Today we will measure different objects to the nearest $\frac{1}{2}$ inch. What does $\frac{1}{2}$ inch mean? If the

STRATEGY 1: cont'd

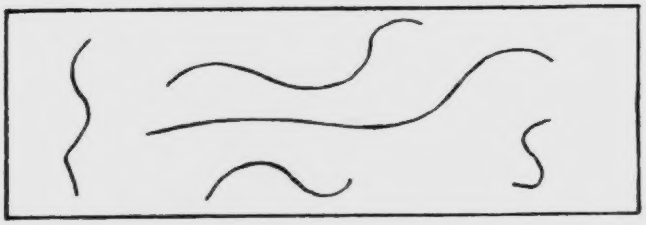
length of an object measures from 0 to half way between the 3 and the 4 on your ruler, how long is that object? (The length of an object half way between 3 and 4 inches is $3 \frac{1}{2}$ inches.)... half way between the 5 and the 6? (The length of an object half way between 5 and 6 inches is $5 \frac{1}{2}$ inches.) Write the name of each object in your notebook and write the length of each object next to it. Be sure to label your answer 'inches' or use the symbol for inches (")." (Demonstrate.) Ask the students to compare their results.

Note: Be certain that the students line up the left edge of the ruler with the left edge of the object.

2.10.10.03 **measure and record the lengths of line segments to the nearest $\frac{1}{2}$ inch**

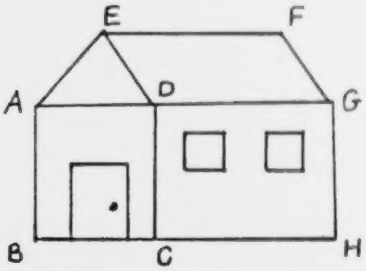
STRATEGY 1: Prepare and distribute pieces of colored yarn, 12 inch rulers with $\frac{1}{2}$ inch markings, glue, construction paper, and scissors to each student or group of students. Say, "Today we will make some line designs with the colored yarn." Ask the students to measure lengths of yarn that are $1 \frac{1}{2}$ inches, $2 \frac{1}{2}$ inches, $3 \frac{1}{2}$ inches, $4 \frac{1}{2}$ inches, and $5 \frac{1}{2}$ inches long. After they measure each of the above lengths of yarn, ask them to cut the yarn and glue them onto the construction paper to create an abstract design.

e.g.,



STRATEGY 2: Prepare and distribute a 12 inch ruler with $\frac{1}{2}$ inch markings and a duplicated sheet with a house made from line segments.

e.g.,



Say, "This house is made of line segments of different lengths. Each line segment has been labeled with a pair of letters." Say, "Let's find the line segments listed and measure them. These line segments are:

AB
CD
EF
GH
AE
DE
FG
CH
DG
BC

You will measure these line segments to the nearest half inch. Then you will write the name of the line segment and its length in your notebook. (Demonstrate.) Be sure to label your answer in inches."

e.g.,

AB = $3 \frac{1}{2}$"

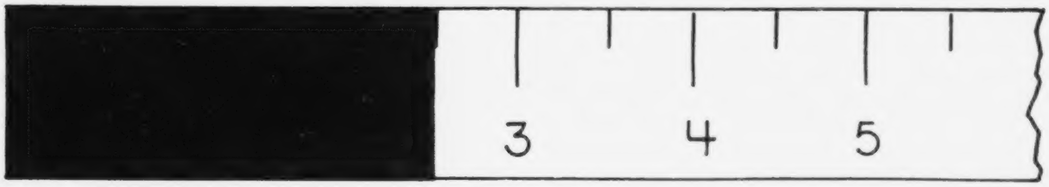
CD = $3 \frac{1}{2}$"

EF = $4 \frac{1}{2}$"

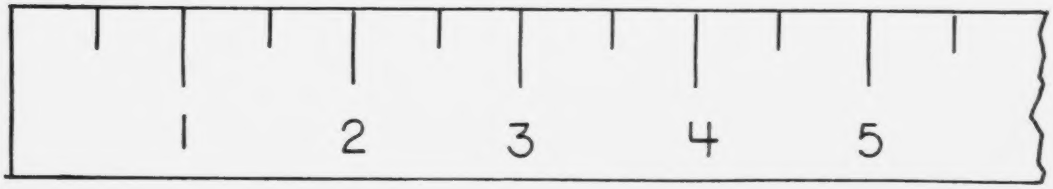
P.O. 2.10.10.01

NAME:______________________________ CLASS:__________ DATE:________

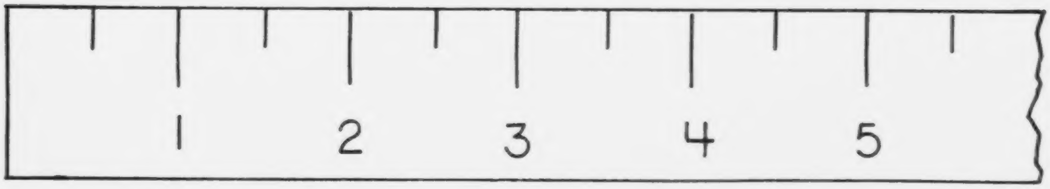
Color the rulers the number of inches named at the end of each ruler.



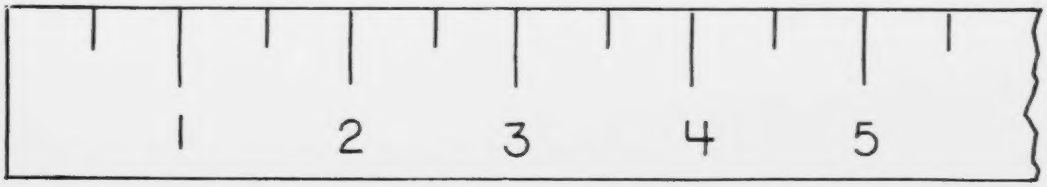
2½ INCHES



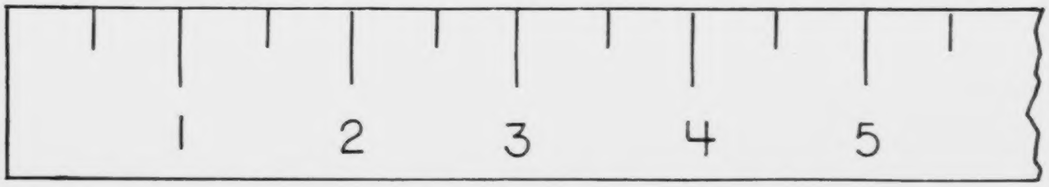
4½ INCHES



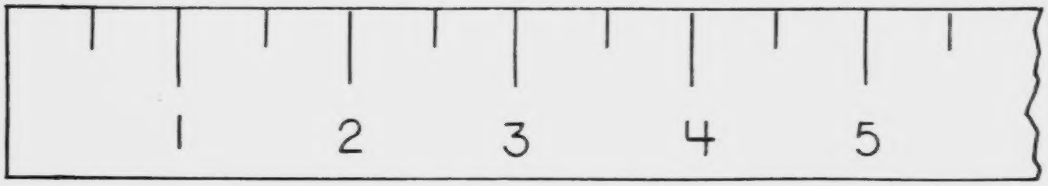
1½ INCHES



3½ INCHES



5½ INCHES

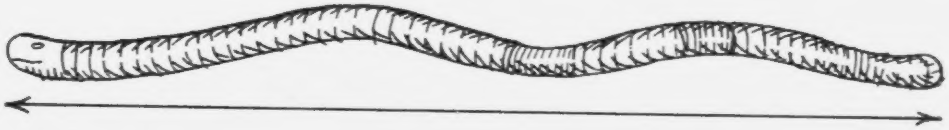


½ INCH

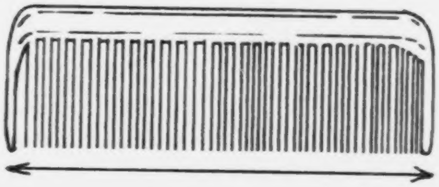
P.O. 2.10.10.02

NAME: ______________________ CLASS: __________ DATE: ________

Use your ruler to measure each picture to the nearest half inch and record its length.



$5\frac{1}{2}$"



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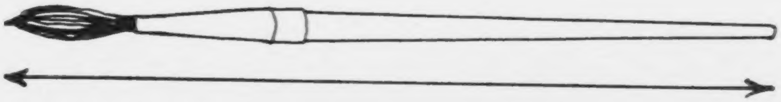

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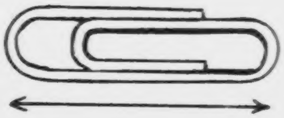

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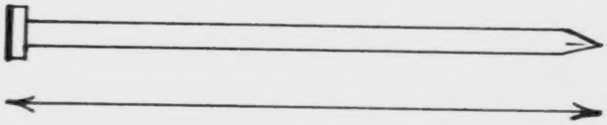

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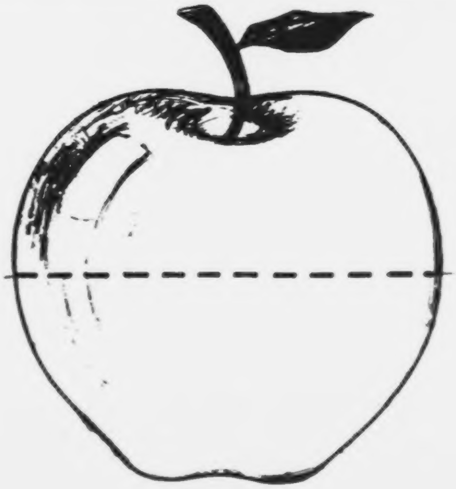
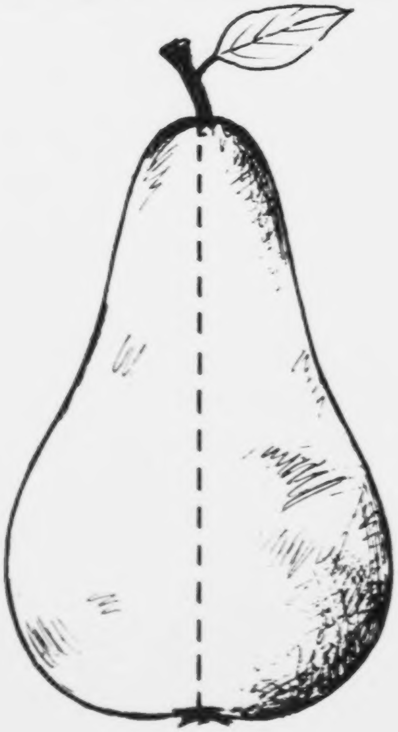
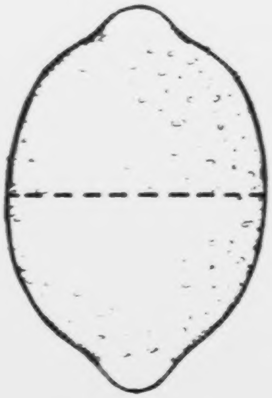
P.O. 2.10.10.03

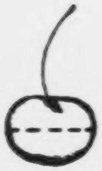
NAME:________________________ CLASS:________ DATE:________

Measure each piece of fruit along the dotted line to the nearest half inch. Record the results on the chart.









Fruit	Length to the Nearest $\frac{1}{2}$ Inch
apple	
pear	
lemon	
cherry	

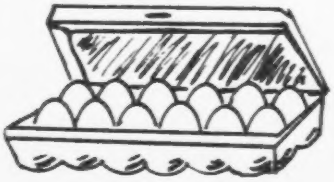
2.10.11 DOZEN AND HALF DOZEN

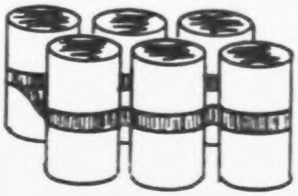
(1-2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

2.10.11.01A identify a group of twelve objects as a dozen and six objects as a half dozen; e.g.,





2.10.11.02A solve story problems related to skills learned in this module.
e.g.,

> Mary used a half dozen eggs to bake bread. Jose used a dozen eggs to bake a cake. How many eggs did they use in all?
>
> They used 18 eggs.

2.10.11

VOCABULARY

TERMS

dozen
half dozen

GETTING STARTED

Prepare and display a number line from 0 through 25 and two magnetic discs, one with a picture of a frog, and one with a picture of a rabbit. Say, "Mr. Frog and Mr. Rabbit went jumping. Mr. Frog was very tired so he only jumped six spaces and rested." Ask a student to move Mr. Frog six spaces. Say, "Mr. Rabbit just ate carrots. He had lots of energy. He jumped twelve spaces." Ask a student to move Mr. Rabbit twelve spaces. Say, "Mr. Rabbit jumped twice as far as Mr. Frog. Mr. Frog jumped half as far as Mr. Rabbit."

Reverse the procedure, showing Mr. Frog jumping 12 spaces and Mr. Rabbit jumping 6 spaces.

Prepare and display 12 cubes, an egg carton, and a box of 12 crayons. Say, "How many sections are in the egg carton?" (12) Ask a student to place a cube in each section. Display the empty crayon box and ask a student to fill it with crayons. Say, "How many crayons fit in the box? (12)

Repeat this procedure by giving all the students an opportunity to count and fill either the egg carton or the crayon box.

2.10.11

2.10.11.01 **identify a group of twelve objects as a dozen and six objects as a half dozen**

STRATEGY 1: Prepare and display one empty egg carton. Say, "Have you ever gone to the store to buy eggs? In what are they sold? (Eggs are sold in an egg carton.) Distribute several egg cartons. Say, "An egg carton has sections. How many eggs can fit into each section? (1 egg can fit into each section of an egg carton.) How many sections does the egg carton have? (An egg carton has 12 sections.) We call 12 eggs a dozen eggs. One dozen equals twelve." Write 1 dozen = 12 on the chalkboard.

Cut the egg carton in half. Display one-half of the carton and say, "How many sections do you see? (There are 6 sections in one-half of an egg carton.) How many eggs will fit into these spaces? (6 eggs will fit into one-half of an egg carton.) This is a half dozen because 6 is one-half of 12." Write a half dozen = 6 on the chalkboard. Ask the students to identify objects that are sold by a dozen or half dozen, e.g., donuts, bagels.

STRATEGY 2: Prepare chips, blocks, crayons, and several containers, each of which hold up to twelve objects; e.g. a crayon box, an egg carton, a muffin tin. Display each container and say, "Each one of these containers can hold one dozen objects. Let's find out how many items equal one dozen by filling each container." Ask a student to place a chip in each section of the muffin tin. How many chips did you use? (12)" Ask another student to fill the egg

STRATEGY 2:
cont'd

carton by placing one block in each section. Say, "How many blocks did you use?" (12) Ask another student to fill the crayon box with crayons. Say, "How many crayons fit into the box? (12) Each of these containers hold one dozen objects. How much is one dozen? (12) How many objects are in a container that holds one dozen objects?" (12 objects can fit into a container that holds one dozen objects.) Write one dozen = 12 on the chalkboard. Ask the students to empty the containers. Say, "I want to fill half of each container. If one dozen equals 12, how many objects will fill one-half of each container? (6 objects will fill one-half of the container of 12 objects.) Another name for 6 is a half dozen." Ask several students to place chips in half the sections of the muffin tin, blocks in half the sections of the egg carton, and crayons to fill half the crayon box. Say, "Each container now has a half dozen objects. How many sections did we fill with chips? (6)...blocks? (6) How many crayons did we place in the crayon box? (6) If 12 objects are in one dozen, how many objects are in a half dozen? (There are 6 objects in one-half of a dozen.) Yes, because six is half of twelve. If you buy a half dozen cans of juice how many cans will you buy? (6 cans of juice are the same as a half dozen cans of juice.) If you have a half dozen apples, how many apples do you have? (6 apples are the same as a half dozen apples.) If you have a half dozen pencils, how many pencils do you have?" (6 pencils are the same as a half dozen pencils.)

Reinforce this concept by asking students to illustrate, on paper, a dozen objects and a half dozen objects and label them appropriately.

2.10.11

2.10.11.02 **solve story problems related to skills learned in this module**

STRATEGY 1: Prepare and display pictures of items to buy by the dozen and by the half dozen, e.g., a carton of eggs, a box of donuts, a six pack of juice, a bag of oranges. Say, "Today we will pretend to go shopping in the supermarket. We will buy two cartons of eggs. How many dozen eggs will we buy? (2 dozen) How many eggs are in each carton? (There are 12 eggs in each carton.) How can we find out how many eggs we bought all together? (add 12 + 12.) How many eggs did we buy in all?" (We bought 2 dozen or 24 eggs.) Ask the students to solve the problem at their desks as you write it on the chalkboard.

e.g.,

$$\begin{array}{r} 12 \text{ eggs} = 1 \text{ dozen} \\ +12 \text{ eggs} = 1 \text{ dozen} \\ \hline 24 \text{ eggs} = 2 \text{ dozen} \end{array}$$

Repeat this procedure using other story problems.

STRATEGY 2: Say, "Mother went to the bakery and bought some donuts. She bought a half dozen jelly donuts and a half dozen apple donuts." Draw the donuts on the chalkboard. Say, "How many donuts did she buy all together?" Ask a student to count the number of jelly donuts and apple donuts. Say, "How much is one half dozen?" (6 equals one half dozen.) Ask a student to write an example at the chalkboard to solve this problem.

e.g.,

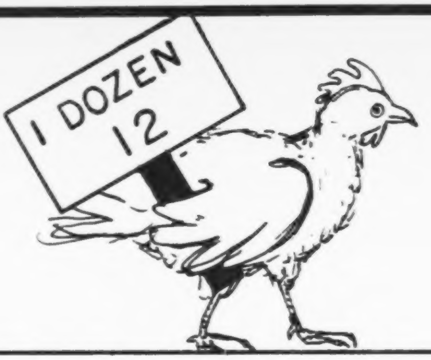
$$\begin{array}{rl} 6 & \text{donuts} = \text{one half dozen} \\ +\ 6 & \text{donuts} = \text{one half dozen} \\ \hline 12 & \text{donuts} = 1 \text{ dozen} \end{array}$$

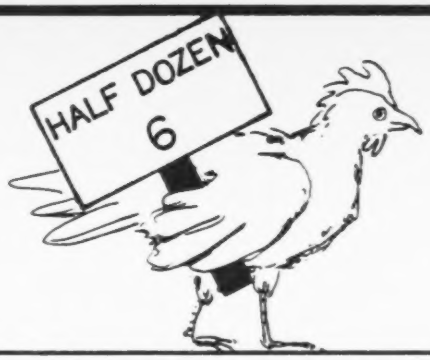
Repeat this procedure adding one dozen and a half dozen items.

P.O. 2.10.11.01

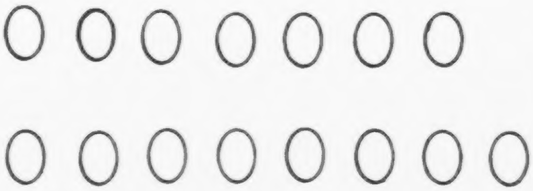
NAME: ______________________ CLASS: ________ DATE: ________

Follow the directions below.

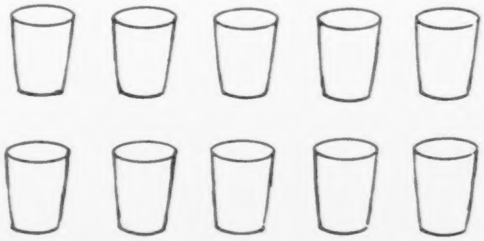




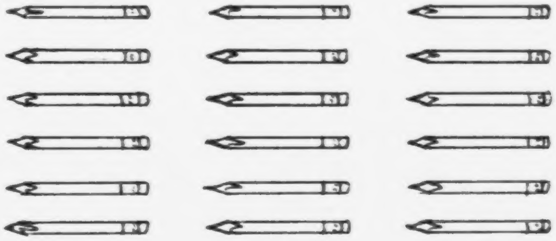
1. Place an X on one dozen eggs.



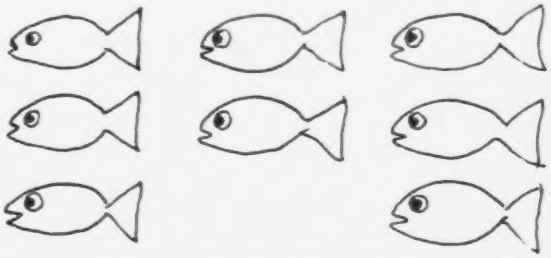
2. Place an X on a half dozen cups.



3. Place an X on one dozen pencils.



4. Place an X on a half dozen fish.



DO YOU REMEMBER?

This month is ________________.

Last month was ________________.

Next month will be ________________.

P.O. 2.10.11.02

NAME: ______________________ CLASS: ________ DATE: _______

Solve each problem.

Mother bought 6 apples.
Father bought 6 apples.
How many apples did they buy?

$$\begin{array}{r} 6 \\ +\,6 \\ \hline \end{array}$$

☐ apples

☐ dozen apples

John ate a half dozen eggs.
Joe ate a half dozen eggs.
How many eggs did they eat?

a half dozen = ☐

+ a half dozen = ☐

= ☐

Mother bought a dozen chocolate cookies and a half dozen vanilla cookies. How many cookies did she buy?

☐

☐

☐ cookies

Mother bought a dozen eggs.
Six of the eggs were eaten.
How many eggs were left?

☐

☐

☐ eggs

☐ dozen eggs

DO YOU REMEMBER?

Place a √ next to the words which describe a triangle.

3 sides ____

no corners ____

4 corners ____

3 corners ____

round ____

4 sides ____

2.10.12 TIME - QUARTER HOUR, MINUTES, AND SECONDS

(2-3 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

2.10.12.01B identify relationships between seconds and minutes, and minutes and hours;

e.g.,

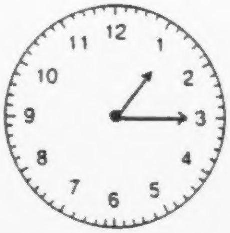
60 seconds = 1 minute

60 minutes = 1 hour

2.10.12.02B read and write time to the quarter hour from a standard and a digital clock;

e.g.,

quarter after 1 (1:15)



2.10.12.03B solve story problems related to skills learned in this module.

e.g.,

Mother cooked a one minute egg.
For many seconds did she cook the egg?

VOCABULARY

TERMS

digital
seconds
one-quarter

GETTING STARTED

Prepare and display a clock. Distribute individual toy clocks with movable hands to each student or group of students. Say, "We begin reading at nine o'clock." Ask the students to show nine o'clock on their clocks as a student shows nine o'clock on the display clock. Repeat this procedure with other times on the hour and half hour.

Write 1:00 on the chalkboard. Ask a student to read it and show the time on the display clock. Write 1:30 on the chalkboard. Ask the students to read the time and show it on their clocks.

Repeat this procedure with other times on the hour and half hour in digital form.

Prepare and display a number line from 0 through 60. Use this number line to practice skip-counting by fives through 60.

2.10.12

2.10.12.01 **identify relationships between seconds and minutes, and minutes and hours**

STRATEGY 1: Prepare and display a clock with a second hand. Say, "Johnny eats lunch from 12 o'clock until 1 o'clock. How much time does Johnny have for lunch? (one hour) Let's find out how many minutes that will be. Each numeral on the clock represents five minutes. If we count by fives, we can find out how many minutes are in one hour." Ask a student to point to each numeral as he/she counts by fives. Say, "How many minutes did you count? (60 minutes) There are 60 minutes in one hour." Write 60 minutes = 1 hour on the chalkboard.

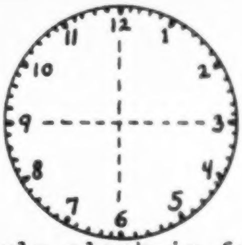
Hold up the clock and say, "How many hands does this clock have? (3) What are the names of the hands? (hour hand, minute hand, second hand) The hour hand measures time in hours and the minute hand measures time in minutes. What will the second hand measure?" (The second hand measures time in seconds.) Say, "Watch the second hand move around the clock. Does the second hand move faster or slower than the minute hand?" (faster) Ask a student to count all the lines around the edge of the clock as the second hand points to them. Say, "To how many lines does the second hand point?" (60) Set the clock to one o'clock. Say, "Let's mark the spot where the minute hand is." Move the second hand around the clock once. Say, "What happened to the minute hand? (In 60 seconds it moved one minute.) How many seconds are in one minute?" (60 seconds) Write 60 seconds = 1 minute on the chalkboard.

2.10.12

2.10.12.02 **read and write time to the quarter hour from a standard and a digital clock**

STRATEGY 1: Prepare and display an analog clock, a digital clock, and a paper circle with a clock face on it. Ask a student to fold the paper clock into fourths or quarters.

e.g.,



After the circle clock is folded, point to one part and say, "What do we call each fractional part of this circle clock? (one-fourth) Each part may also be called one quarter." Draw a line along the folds so the quarters are easy to see.

Say, "What does each numeral on the clock represent when we count minutes? (five minutes each) Point to the first quarter on the paper clock and say, "Which numerals are in this quarter of the clock? (1,2, and 3) Look at the fold line going through the numeral 3. How many minutes have passed when the minute hand is on the three? (15 minutes) When 15 minutes have passed, we can say that one quarter of an hour has passed." Using the clock, arrange the hands to show 10:00. Move the minute hand from 10:00 to 10:15. Say, "We can read this time as 10:15 or as 15 minutes after 10 because 15 minutes have passed since 10 o'clock. We can also read it as a quarter after 10 because a quarter of an hour equals 15 minutes." Ask several students to tell the time in minutes (10:15 or 15 minutes after 10) and as a quarter after the hour (quarter after 10) and to write the time on the chalkboard. Show the same time using a digital clock.

STRATEGY 1: cont'd

Explain that when two quarters of an hour pass, they equal a half-hour.

Adapt the procedure for teaching a quarter after the hour to teach a quarter to the hour. Discuss what happens to the hour hand as the minute hand moves around the clock.

2.10.12.03 **solve story problems related to skills learned in this module**

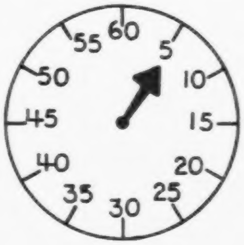
STRATEGY 1: Write a word problem on the chalkboard.

eg.,

> Mary is helping her mother bake a cake. The cake must bake in the oven for one hour. The timer on Mary's oven only shows minutes. How many minutes must the cake bake?

Draw the timer on the chalkboard.

e.g.,



Say, "What do we need to know in order to solve this problem? (There are 60 minutes in an hour.) How many minutes must the cake be in the oven to bake one hour?" (The cake must bake 60 minutes.)

Repeat this procedure with other problems using analog and digital clocks.

2.10.12

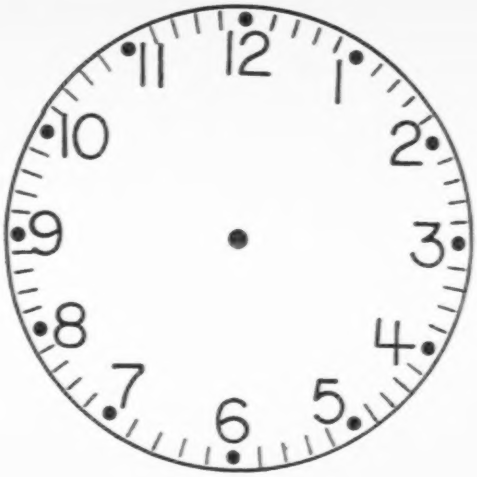
STRATEGY 2: Prepare and distribute a clock face to each student. Say, "The large hand is the minute hand. How many minutes does it take to equal a quarter of an hour? (15 minutes) Bill's favorite TV program begins at 4 o'clock. It lasts for fifteen minutes. What time does it end? Set your clocks at 4 o'clock. Move the minute hand fifteen minutes. What time is it?" (4:15, 15 minutes after 4, or a quarter after 4)

Repeat this procedure with similiar time problems using analog and digital clocks.

P.O. 2.10.12.01

NAME: ____________________ CLASS: ________ DATE: ________

Use the clock face to help you write the missing numerals.



60 seconds = ___ minute

60 minutes = ___ hour

1 hour = ___ minutes

1 minute = ___ seconds

DO YOU REMEMBER?

Solve	Check	Solve	Check
45 + 37		64 + 29	

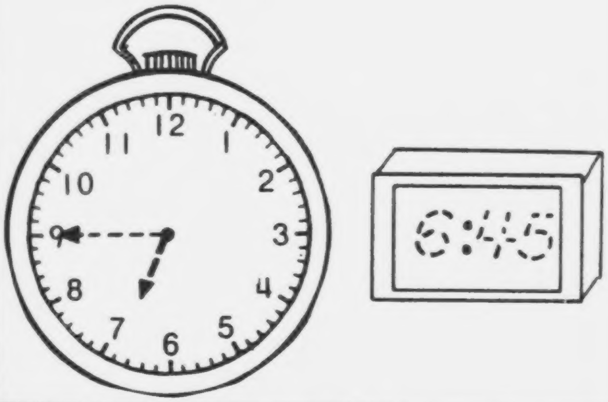
580

P.O. 2.10.12.02

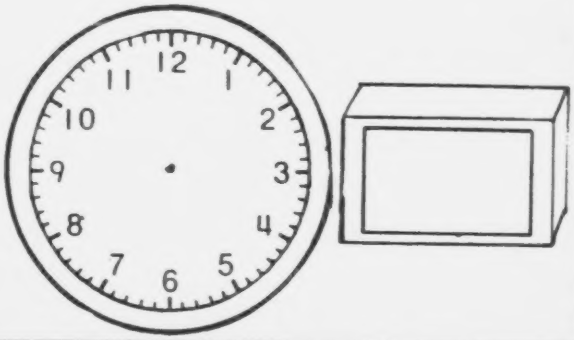
NAME: ______________________ CLASS: __________ DATE: ________

Draw the hands to show the correct time. Write the time in the digital clocks.

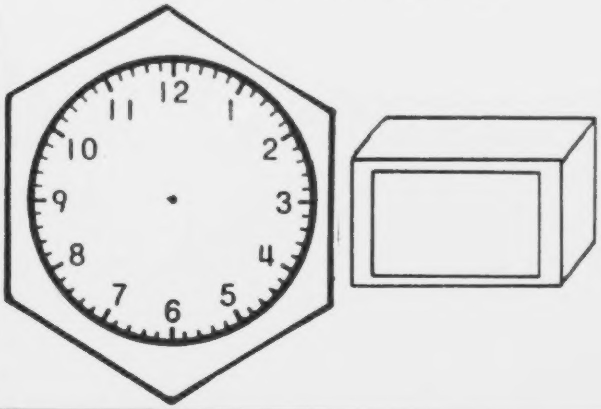
quarter to 7


12
1
2
3
4
5
6
7
8
9
10
11
6:45

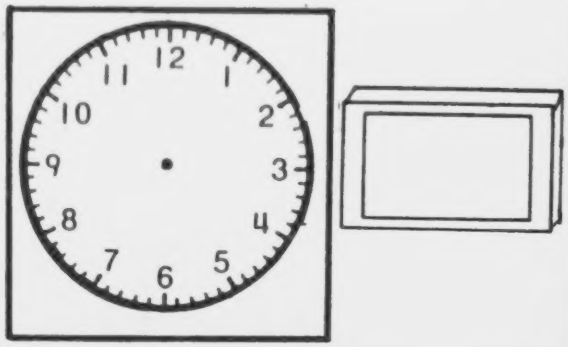
quarter after 9


12
1
2
3
4
5
6
7
8
9
10
11

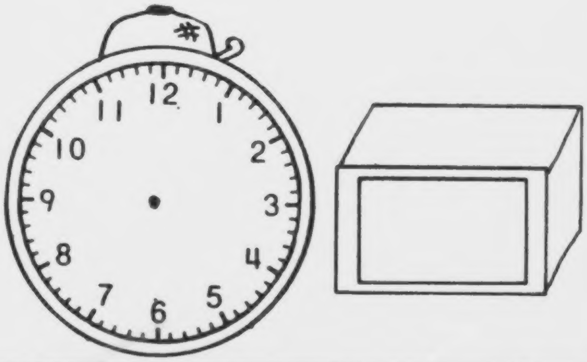
quarter after 3


12
1
2
3
4
5
6
7
8
9
10
11

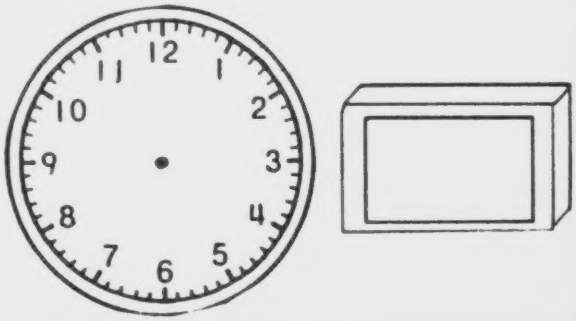
quarter to 5


12
1
2
3
4
5
6
7
8
9
10
11

quarter to 1


12
1
2
3
4
5
6
7
8
9
10
11

quarter after 11

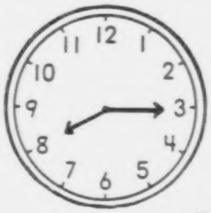

12
1
2
3
4
5
6
7
8
9
10
11

P.O. 2.10.12.02

NAME: ______________________ CLASS: __________ DATE: ________

Hector's mother went away for the day. She left him a list of things to do. Help Hector by writing the time next to the clocks in two different ways.

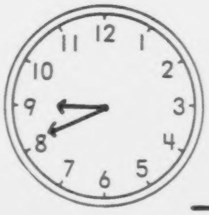
Eat breakfast.



8:15

quarter after 8

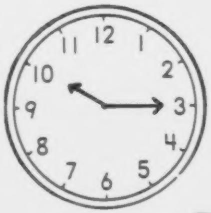
Clean your room.



____

____

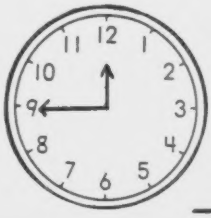
Go to the supermarket.



____

____

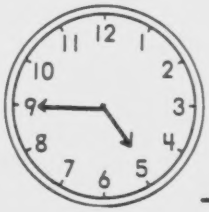
Eat lunch.



____

____

Walk the dog.



____

____

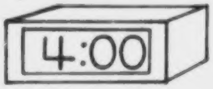
P.O. 2.10.12.03

NAME:____________________ CLASS:________ DATE:________

Solve each problem.

1. Mary ran in a race.
   It took her 1 minute to run the race.
   How many seconds did it take?

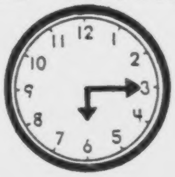
   ____

2. Jose started his homework at 3:30.
   When he finished, the clock looked
   like this. 

   How long did it take Jose to do his homework?

   ____

3. Mother saw that her kitchen clock had stopped.
   She looked at her watch. It looked like this.

   What time is it? ________________

4. It took Kevin 1 hour to clean his room.
   How many minutes did it take?

   ____

2.09.04 ATTRIBUTES OF THREE-DIMENSIONAL OBJECTS

(1 lesson)

PERFORMANCE OBJECTIVES

The student will be able to...

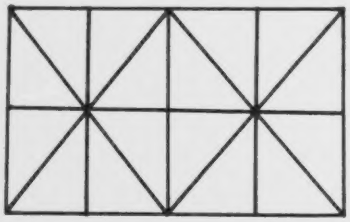
2.09.04.01B compare attributes such as size, shape, and weight of common three-dimensional objects; e.g.,

pieces of fruit, balls, cereal boxes

2.09.04.02C compare attributes such as texture, or properties such as sliding or rolling; e.g.,

cans, fruit, blocks

2.09.04.03C recognize shapes that fit without gaps. e.g.,



VOCABULARY

TERMS

attributes
rectangular

GETTING STARTED

Prepare and display red and blue circles and a small red square. Discuss the similarities among these objects. Say, "We often compare things by looking at their sizes, shapes, and colors. What are other ways in which we compare objects?" Accept all reasonable responses. Discuss the differences among these objects.

Prepare a bag of objects, e.g., cotton, a stone, a sponge, a nail file. Ask the students to reach into the bag and describe how each object feels, e.g., hard, soft, rough.

As a variation, glue objects with various textures to a piece of cardboard, e.g., sandpaper, styrofoam, cotton, fabric, corrugated cardboard. Ask the students to touch each item and describe how it feels.

2.09.04

2.09.04.01 **compare attributes such as size, shape, and weight of common three-dimensional objects**

STRATEGY 1: Draw a chart on the chalkboard.

e.g.,

	Rectangular	Round	Heavy	Light	Large	Small
cotton ball						
baseball						
cereal box						
brick						

Prepare and display a cotton ball, a baseball, a box of cereal, and a brick. Display the cotton ball. Ask a student to hold the cotton ball and say, "Can you describe this cotton ball? Is it round or shaped like a rectangle? Is it heavy or light? Is it large or small?" Place a check (✓) for each response in the appropriate column on the chart. Repeat this procedure using the other objects. Say, "Which items have things in common? What are they? What other objects can you name that are round?...light?"

STRATEGY 2: Draw a chart on the chalkboard.

e.g.,

	Attributes		
	Round	Heavy	Small
chalk	✓		✓

Say, "We will play a game called Object Hunt. Each row of students is a team. I will ask you to find an

STRATEGY 2: cont'd

object that is round, heavy, or small. You will name the object and check the place or places on the chart that describe it. If you check one space your team scores 1 point. If your object belongs in more than one column, your team scores 5 points. No points are given for an object already on the chart." Ask a student in the first row to find an object that is round. (The globe is round.) Say, "Team One scores one point." Ask a student in the second row to find an object that is heavy. (The dictionary is heavy and its cover is shaped like a rectangle.) Say, "Team Two scores 5 points."

Repeat this procedure until one team scores fifteen points.

2.09.04.02 compare attributes such as texture, or properties such as sliding or rolling

STRATEGY 1: Prepare and display 4 boxes labeled smooth, rough, slides, and rolls respectively and several trays of cans, pieces of fruit, blocks, and sandpaper. Circulate the Trays. Say, "Touch each object. Pick up a can and try to roll it. Does it roll? Can you do this with a block? ...an apple? What kind of objects roll easily? Pick up a piece of fruit and a block. Notice that the fruit is firm but not hard and that the block is hard and has edges." Then ask the students to describe the objects in their own words.

After the attributes have been described, ask the students to each place an object in the appropriately labeled box. Say, "Which items are in the same boxes?"

STRATEGY 2: Prepare and display a can, a banana, and a wooden

STRATEGY 2: cont'd

block. Ask the students to describe each object and list the attributes on the chalkboard.

e.g.,

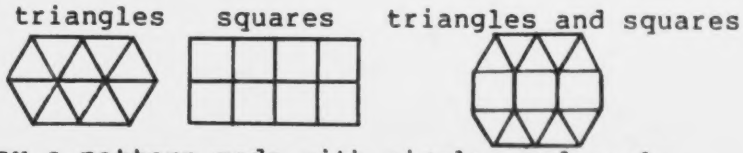
can	banana	block
smooth	smooth	hard
rolls	does not roll	does not roll

Display three other objects and ask the students to describe and compare their attributes.

2.09.04.03 **recognize shapes that fit without gaps**

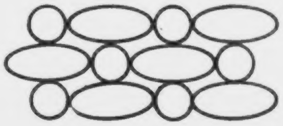
STRATEGY 1: Prepare cardboard circles and ovals, and several pictures of patterns made with 3- or 4- sided tiles. Say, "To make these designs, triangles or squares fit together. Are there any spaces or gaps between the shapes? (no) Some shapes fit together without leaving spaces. Which shapes fit together in each picture?" List the shapes on the chalkboard.

e.g.,



Display a pattern made with circles and ovals.

e.g.,



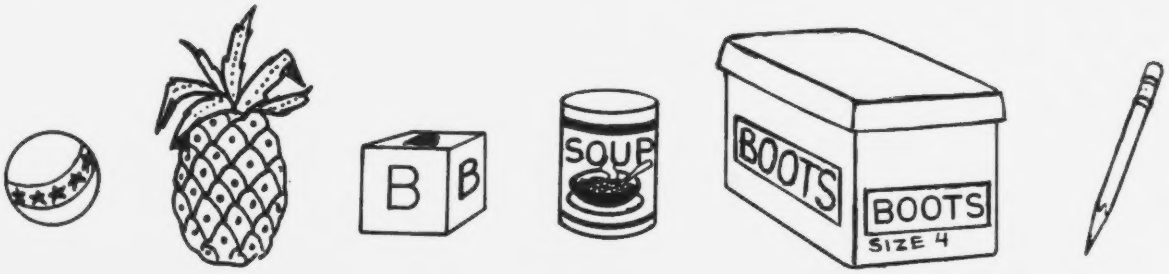
Say, "Can circles fit together without leaving spaces? (No) Explain." Ask a student to place the magnetic discs side by side to make a pattern.

STRATEGY 2: Prepare several pictures of wall and/or floor patterns made with tiles, several cardboard triangles of equal size, squares of equal size, rectangles of equal size, and circles of equal size. Display the pictures of wall and/or floor patterns. Say, "How were the patterns for each picture made? (Various shapes were fitted together to make a pattern.) Do you see any spaces or gaps between the shapes? (no) Some shapes will fit together without leaving gaps. What shapes have been fitted together in each picture?" Write a list of these shapes on the chalkboard, e.g., triangles, squares, rectangles... Distribute the cardboard triangles to one group of students and say, "Fit these triangles together to make a pattern." Repeat this procedure with the other shapes and with other groups of students. When the patterns are made, say, "Which shapes were used to form patterns without gaps? (triangles, rectangles, squares.) Which shapes, when placed together in a pattern, left gaps?" (circles)

P.O. 2.09.04.01

NAME: ______________________ CLASS: ________ DATE: ________

Look at the objects. Choose a word from the list to complete each sentence. Some sentences may have more than one correct answer.



larger, smaller, heavier, lighter, square, round

1. The ball is ____________ than the pineapple.
2. The box of boots is ____________ than the pencil.
3. The shape of the ball is ____________.
4. The soup can is ____________ than the pencil.
5. The side of the block is ____________.
6. The pencil is ____________ than the rain boots.

DO YOU REMEMBER?

Solve Check

$2.45
+3.22
$.

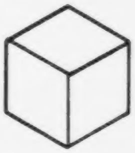
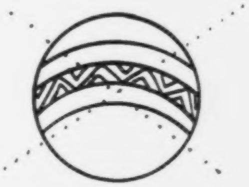
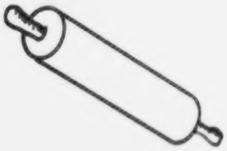
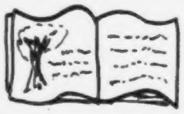
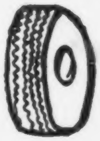
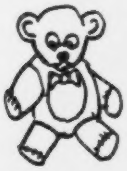
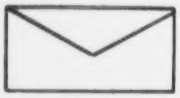
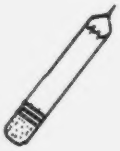
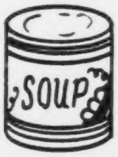
Solve Check

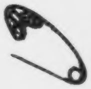
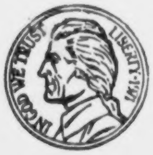
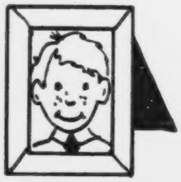
$4.36
+5.62
$.

P.O. 2.09.04.02

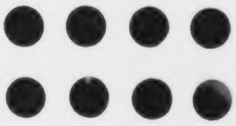
NAME: ______________________ CLASS: ________ DATE: ______

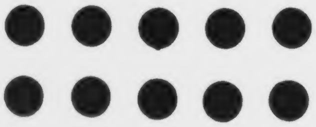
Place an X on the objects which can roll.



IN GOD WE TRUST
LIBERTY


DO YOU REMEMBER?


one-half of eight = ______

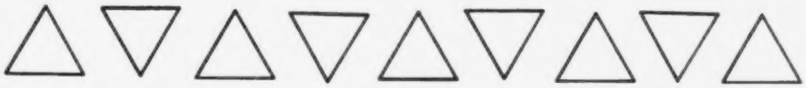

one-half of ten = ______

P.O. 2.09.04.03

NAME: ____________________ CLASS: ________ DATE: ________

Place a check on the line near each group of shapes which will fit together without spaces.

✓ ____



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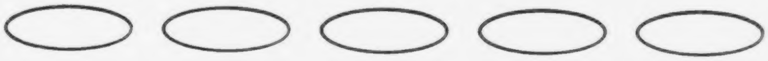

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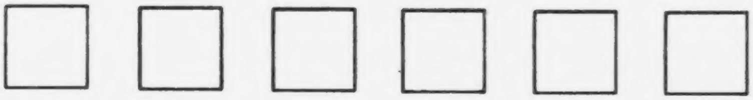

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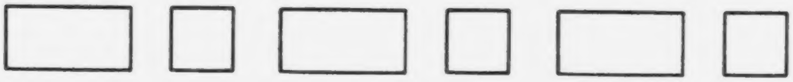

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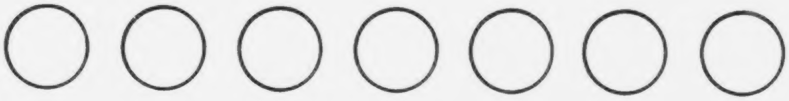

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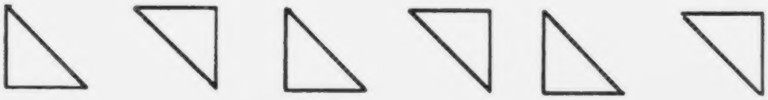

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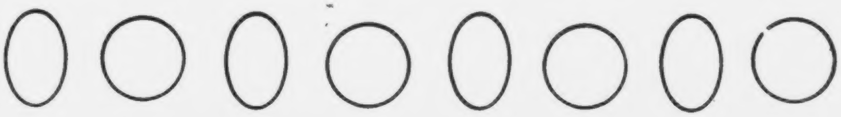


DO YOU REMEMBER?

Mrs. Gold has 20 pencils.
Her 5 children will share them equally.
How many pencils will each child get?

______ pencils

2.02.06 COMMUTATIVE AND ASSOCIATIVE PROPERTIES OF ADDITION THROUGH 999

(1-2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

2.02.06.01B use the commutative property of addition with numbers through 999;

e.g.,

$$\begin{array}{r} 123 \\ +321 \\ \hline 444 \end{array} \qquad \begin{array}{r} 321 \\ +123 \\ \hline 444 \end{array}$$

2.02.06.02B use tables to discover patterns of the commutative property;

e.g.,

+	0	1	2	3	4	5	6	7	8	9
0			2			⑤				
1			3		⑤					
2	2	3	4	⑤	6	7	8	9	10	11
3			⑤							
4		⑤	6							
5	⑤		7							
6			8							
7			9							
8			10							
9			11							

2.02.06.03C use the associative property of addition with numbers through 999.

e.g.,

$$(200 + 30) + 6 = 200 + (30 + 6)$$

VOCABULARY

TERMS

commutative property
associative property

GETTING STARTED

Present a problem which requires addition of three addends without regrouping.

e.g.,

> Class 2-302 collected coins for the Statue of Liberty. Peter, Carmen, and Don each counted a bag of coins. Peter counted 213 pennies. Carmen counted 302 nickels. Don counted 134 dimes. How many coins did they count in all?

Ask the students what information is given, what is being asked, and how the problem can be solved. Ask a student to write and solve the example on the chalkboard as the other students solve the problem at their desks.

Prepare and display flashcards each showing the expanded form of a 3-digit number.

e.g.,

$\boxed{200 + 60 + 5}$

Divide the class into two teams. Say, "We will play a game. I will display a card with an expanded number. You will read the expanded number and then say the number it equals. Each time you say the correct number you will score a point for your team."

Continue the game until all the students have participated.

2.02.06

2.02.06.01 **use the commutative property of addition with numbers through 999**

STRATEGY 1: Prepare and distribute squared material (hundreds, tens, and ones) to each student or group of students. Present an addition problem to the students, using 3-digit addends.

e.g.,

Melissa found 123 pennies in her piggy bank.
Renee found 214 pennies in her piggy bank.
How many pennies did both girls find?

Say, "What do we want to find out? What information is given? How will we solve the problem?" Ask a student to write the correct example on the chalkboard.

e.g.,

$$\begin{array}{r} 123 \\ +\underline{214} \end{array}$$

Say, "Use your squared material to represent each number. (Demonstrate.) How many ones are there all together?" (7) Ask a student to write 7 in the ones column. Repeat this procedure for the tens and for the hundreds. Say, "What is the answer?" (337)

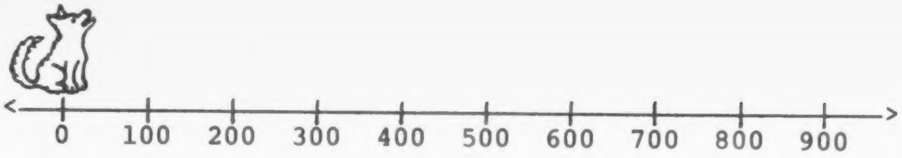
Repeat the above story problem but reverse the addends so that the addition example on the chalkboard reads $\begin{array}{r} 214 \\ +\underline{123} \end{array}$.

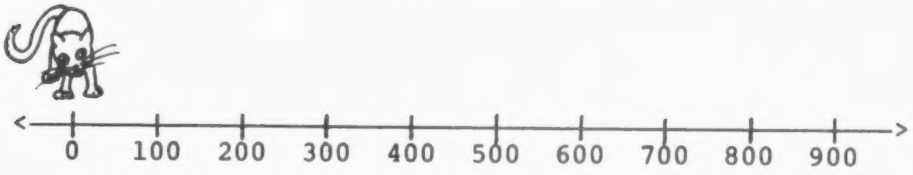
Ask the students to use their squared material to solve the problem as a student solves it on the chalkboard. Say, "What do you notice about both examples? (The addends and the answers are the same.) What is different? (The addends are reversed.) In addition, the order in which we add the numbers does not change the sum."

Repeat this procedure using other addends through 999.

STRATEGY 2: Display two number lines labeled 0 through 900, counting by hundreds.

e.g.,





Prepare and display pictures of a dog and a cat. Place the dog at 0 on the first number line and the cat at 0 on the second number line. Say, "These animals had a race to see who could run farther in 2 days. They both started at 0. The dog ran 300 meters on Monday and 200 meters on Tuesday." Show the jumps from 0 to 300 and from 300 to 500 on the number line. Say, "The cat ran 200 meters on Monday and 300 meters on Tuesday" Show the jumps from 0 to 200 and from 200 to 500 on the number line. Say, "Who can write a number sentence to show the total number of meters the dog ran? (300 + 200 =☐) Who can write a number sentence to show the total number of meters the cat ran?" (200 + 300 =☐) Did the cat run a greater distance than the dog? Did the dog run a greater distance than the cat? Let's find the total distance each animal ran. (500 meters) What do you notice? (Both animals ran the same distance.) Both sums are the same even though the order of the addends was changed."

Repeat this procedure using other 3-digit numbers.

2.02.06

2.02.06.02 **use tables to discover patterns of the commutative property**

STRATEGY 1: Prepare and display two paper rabbits, each a different color. Draw an addition table on the chalkboard.

e.g.,

+	0	1	2	3	4	5
0	0	1	2	3	4	5
1	1	2	3	4	5	6
2	2	3	4	5	6	7
3	3	4	5	6	7	8
4	4	5	6	7	8	9
5	5	6	7	8	9	10

Say, "We can use this addition table to find the sum of two numbers." Explain how the table is used and how it is read. Ask several students to come to the chalkboard to complete the table. Say, "Mr. and Mrs. Rabbit ate some carrots. Mr. Rabbit ate three carrots for breakfast and two carrots for lunch. How many carrots did Mr. Rabbit eat?" (5) Ask a student to write the addition example on the chalkboard. Demonstrate how the addition table is used to locate the answer. Ask the students to place Mr. Rabbit on the appropriate square. Repeat the procedure for Mrs. Rabbit who ate two carrots for breakfast and three carrots for lunch. When Mrs. Rabbit has been placed over the appropriate square (5), say, "What do you notice about Mr. and Mrs. Rabbit?" (They both ate the same number of carrots.) Elicit from the class that the sum is the same regardless of the order of the addends. Have the children conclude that 2 + 3 yields the same sum as 3 + 2. Have the students summarize that when we use an addition table the sum for two pair of numbers with the same addends (3 + 2 = 5

STRATEGY 1: cont'd

and 2 + 3 = 5), will always be the same.

Note: Although the sums are the same, they are not in the same square. The students should discover the diagonal pattern in the addition table.

Repeat this procedure using other pairs of numbers, e.g., 1 + 4, 4 + 1, 1 + 3, 3 + 1.

STRATEGY 2: Prepare an addition table for display. Distribute one red and one blue crayon and addition tables to each student.

e.g.,

+	0	1	2	3	4	5
0	0	1	2	3	4	5
1	1	2	3	4	5	6
2	2	3	4	5	6	7
3	3	4	5	6	7	8
4	4	5	6	7	8	9
5	5	6	7	8	9	10

Say, "An addition table is used to find the sum of two numbers." Explain how the table is used and complete the table with the help of the students. Write several number sentences on the chalkboard.

e.g.,

1 + 2 = ☐ , 2 + 1 = ☐

Say, Use your addition tables to find the sum for each number sentence. Read the first number sentence. Use your red crayon to shade the box in which the sum is found." (Demonstrate.) Repeat this procedure for the second number sentence written on the chalkboard, but this time, ask the students to shade the box blue. (Demonstrate.) Say, "What do you notice about the answers on the addition table? (The answer is along the same diagonal. See the **Note** for Strategy 1, P.O. 2.02.06.02.) How much is 1 + 2? (3) How much is 2 + 1? (3) Are the sums the same? (Yes.) When we

STRATEGY 2: cont'd

use an addition table the sum of a pair of addends with the same digits will always be equal, even if we change the order of the numbers.

Repeat this procedure using other pairs of numbers, e.g., 4 + 1 , 1 + 4; 2 + 3, 3 + 2,...

2.02.06.03 **use the associative property of addition with numbers through 999**

STRATEGY 1: Prepare and distribute squared material (hundreds, tens, and ones) to each student or group of students. Write (200 + 30) + 6 = 200 + (30 + 6) on the chalkboard. Ask a student to read the number sentence. Say, "We add the numbers inside the parentheses first. We will prove that the numbers on the left of the equal sign are equal to the numbers on the right of the equal sign. Let's use our squared material to represent the number 236. (Demonstrate.) Add the hundreds and tens first. Why? How much is 200 + 30? (230) Now let's add the 6 ones to 230. How much is 230 + 6?" (236) Write 236 on the chalkboard below (200 + 30) + 6. Say, "Now let's add the numbers on the right, adding the tens and ones first. Why? How much do they equal? (36) Now let's add the hundreds to 36. How much is 200 + 36?" (236) Write 236 on the chalkboard below 200 + (30 + 6). Say, "Are the sums equal?" (Yes.) Have the students conclude that when we add three numbers, we can add them in any order and the sum will not change.

Repeat this procedure using other numbers through 999.

STRATEGY 2: Prepare and distribute bundles of sticks (hundreds,

STRATEGY 2: cont'd

tens and ones) to each student or group of students. Present a story problem to the students. e.g.,

> Mark and Henry counted popsicle sticks. The boys separated them into hundreds, tens and ones. Mark counted the hundreds and tens first. Then he added the ones. Henry counted the tens and ones first. Then he added the hundreds. How many sticks did each boy count?

Write (100 + 20) + 4 = 100 + (20 + 4) on the chalkboard.

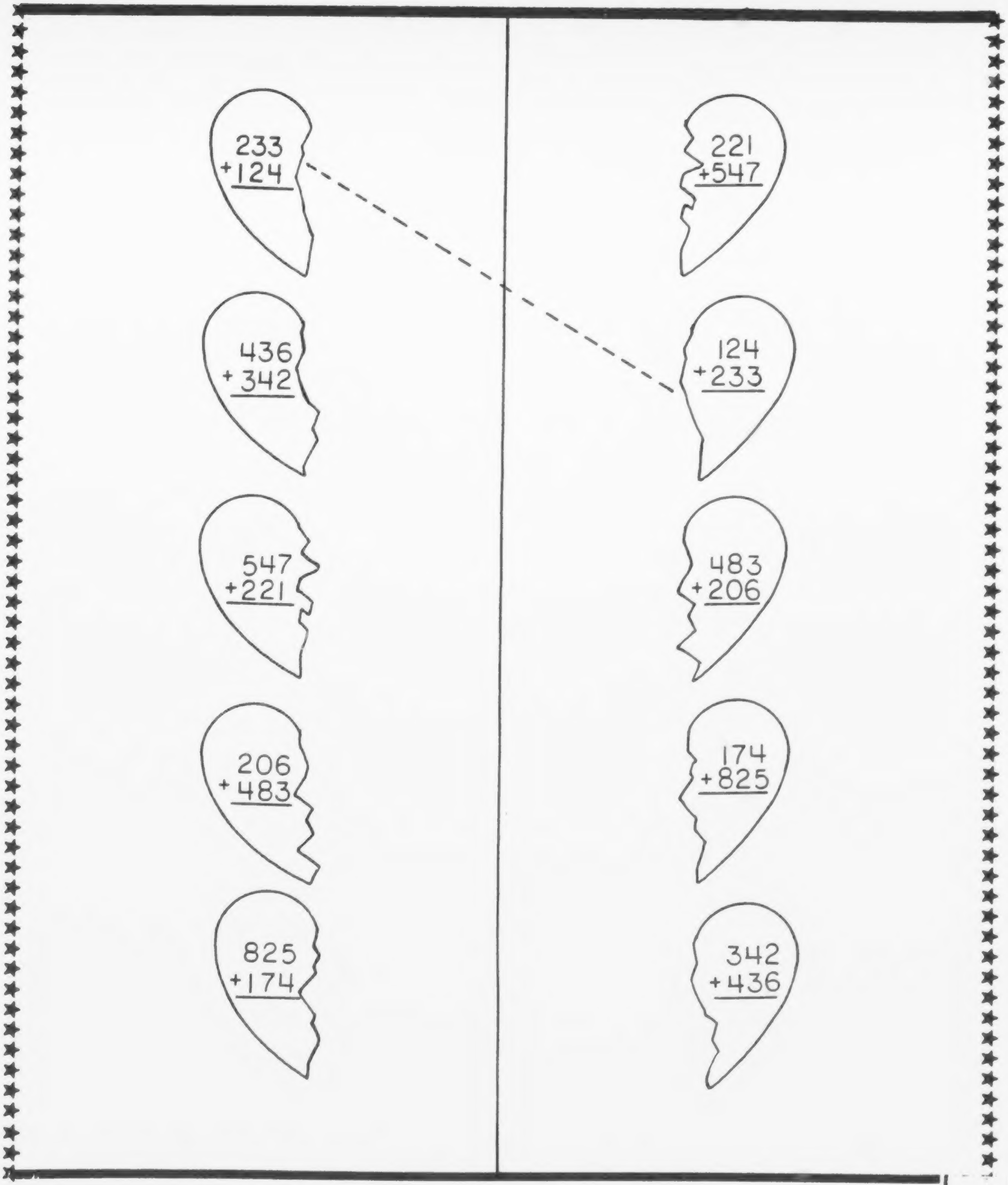
Say, "The parentheses in each number sentence tells us which sticks each boy counted first. Let's see if Mark and Henry counted out the same number of sticks to represent 100 + 20 + 4. How many hundreds? (1) ...tens? (2) ...ones? (4) Mark added the groups of tens and hundreds first. How much is 100 + 20? (120) Then he added the ones. How much is 120 + 4?" (124) Write 124 on the chalkboard below (100 + 20) + 4. Say, "Henry had the same number of sticks but he decided to add the tens and ones first. How much is 20 + 4? (24) Then he added the hundreds. How much is 100 + 24?" (124) Write 124 below 100 + (20 + 4). Say, "Did both boys count the same number of sticks? (Yes.) Although at first, each boy counted differently they still counted the same total number of sticks." Have the students conclude that when adding three numbers, the order in which we add them will not change the sum.

Repeat this procedure using other numbers and story problems.

P.O. 2.02.06.01

NAME:__________________________________CLASS:________DATE:_______

Mend the broken hearts by drawing a line between the halves which will have the same sum. Check by finding the sums.


233 + 124
221 + 547
436 + 342
124 + 233
547 + 221
483 + 206
206 + 483
174 + 825
825 + 174
342 + 436

P.O. 2.02.06.02

NAME: ____________________ **CLASS:** ________ **DATE:** ________

Follow the directions below.

Complete the addition table.

+	0	1	2	3	4	5	6	7
0		1	2	3		5		7
1	1	2	3		5		7	
2	2	3	4	5	6	7		9
3				6		8	9	
4	4	5		7	8		10	11
5			7		9	10		12
6			8	9		11	12	13
7	7	8		10		12	13	

Find the sum for each pair of numbers. Color the box with the sum by using the color given.

If 2 + 3 = ☐ then 3 + 2 = ☐ (red)

If 4 + 5 = ☐ then 5 + 4 = ☐ (green)

If 1 + 7 = ☐ then 7 + 1 = ☐ (blue)

If 3 + 4 = ☐ then 4 + 3 = ☐ (yellow)

DO YOU REMEMBER?

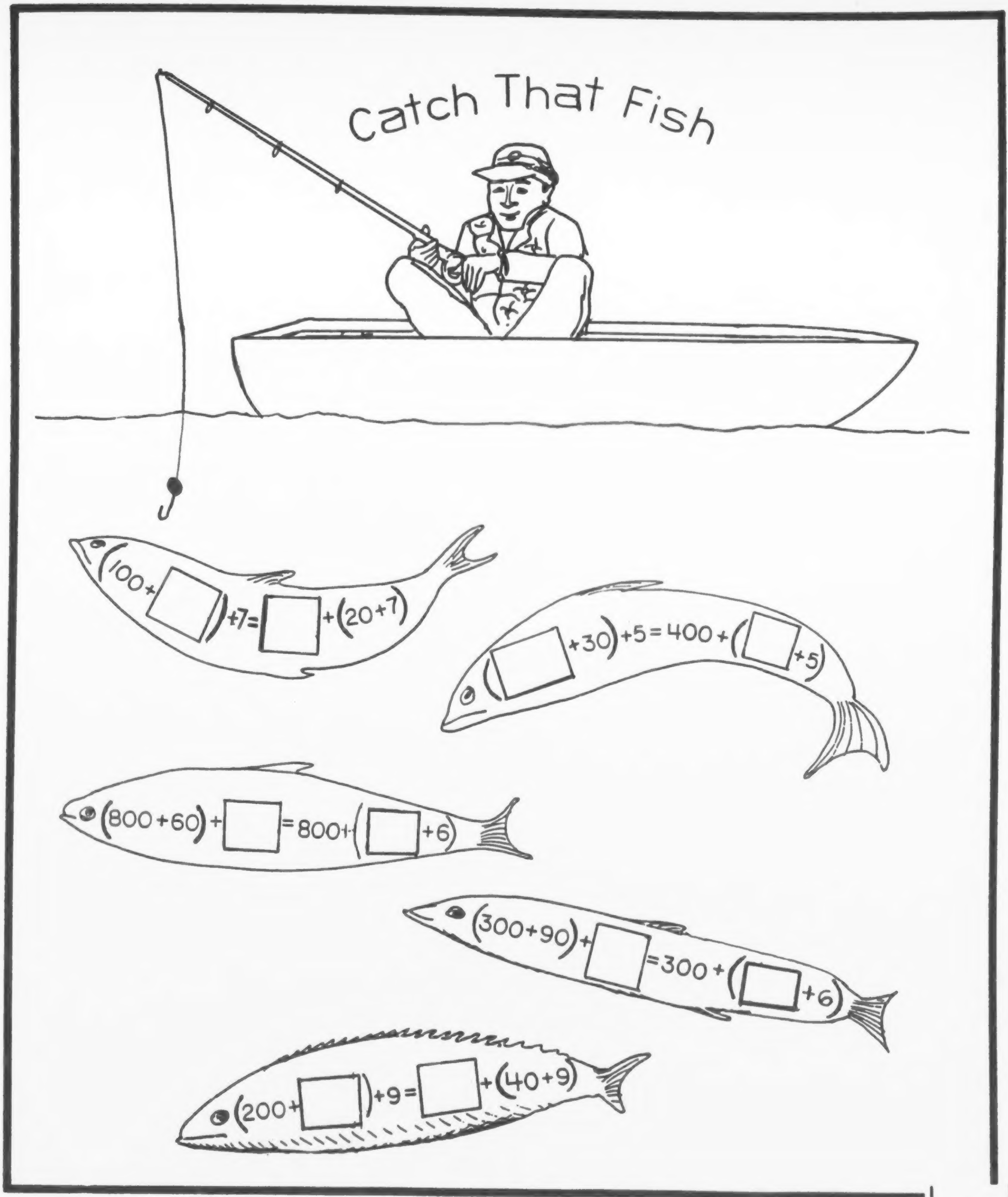
Tom's favorite television show begins at 4 o'clock.
It lasts for 60 minutes.
What time does it end?

____

P.O. 2.02.06.03

NAME:______________________________ CLASS:__________ DATE:________

Help the fisherman make a big catch by writing the missing numerals.


Catch That Fish
(100+☐)+7=☐+(20+7)
(☐+30)+5=400+(☐+5)
(800+60)+☐=800+(☐+6)
(300+90)+☐=300+(☐+6)
(200+☐)+9=☐+(40+9)

2.03.06 PROPERTIES OF SUBTRACTION

(1 lesson)

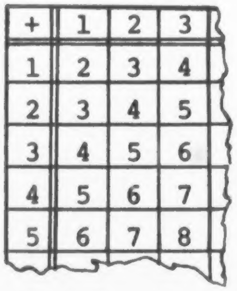
PERFORMANCE OBJECTIVES

The student will be able to...

2.03.06.01B recognize that the commutative property does not apply to subtraction;
e.g.,

10 + 2 = 2 + 10 yes
10 - 2 = 2 - 10 no

2.03.06.02B use a table to discover the inverse relationship between addition and subtraction.
e.g.,



+	1	2	3
1	2	3	4
2	3	4	5
3	4	5	6
4	5	6	7
5	6	7	8

2 + 1 = 3
3 - 1 = 2

2.03.06

VOCABULARY

TERMS

commutative property
addends
sum
difference

GETTING STARTED

Prepare a set of cards for the game I Am.
e.g.,

Numeral Side of Cards	Back of Cards
7	4 + 5
3	6 + 4
5	5 + 1
6	6 + 2
8	5 + 2
10	2 + 1
9	2 + 3

Distribute the cards to several students. Ask a student to read the side of the card with one numeral and then the back of the card in the following way; "I am 7. Who has 4 + 5?" The student with the numeral 9 card will say, "I am 9", turns the card over and says, "Who has 2 + 3?" The student holding the card with the numeral 5 says, "I am 5. Who has 5 + 1?" Repeat this procedure until everyone has had a turn.

Prepare 0 through 9 numeral cards. Say, "When it is your turn, select two cards. Make up a subtraction fact using these cards. If you pick a 6 and a 9 you will make the number sentence 9 - 6 = 3." Write each subtraction fact and its answer on the chalkboard.

Repeat this procedure until each student has had a turn.

2.03.06

2.03.06.01 **recognize that the commutative property does not apply to subtraction**

STRATEGY 1: Prepare and distribute interlocking cubes of two colors to each student or group of students. Display two sets of cubes (one set of four red cubes and one set of two blue cubes). Join the sets by interlocking the cubes. Say, "What number sentence describes the joining of these cubes?" Write 4 + 2 = 6 on the chalkboard. Disconnect the cubes and rejoin them by reversing the order. Write 2 + 4 = 6. Say, "In addition the order of the addends does not change the sum."

Say, "Hold seven cubes of one color. Take away three cubes. How many are left? (4) What number sentence describes what was done? (7 - 3 = 4) Now try to take seven away from three. Can you do it? (No) Subtraction is not like addition. In what ways are they different?" Elicit responses from the students which indicate an understanding of why the commutative property does not apply.

Note: The term, commutative property may be used but is not expected to be mastered by the students.

STRATEGY 2: Prepare and display two pieces of construction paper which have been taped together, each a different color. Place four paper clips on one color and five paper clips on the other color. Say, "What number sentence describes the total number of paper clips?" (4 + 5 = 9) Reverse the order of the papers and say, "What number sentence describes the paper clips now?" (5 + 4 = 9) Say, "If we change the order of the numbers in addition, the sum remains the same."

2.03.06

STRATEGY 2: cont'd

Write the related addition sentences on the chalkboard.

e.g.,

4 + 5 = 9
5 + 4 = 9

Say, "What would happen if we tried this with subtraction?" Write 6 - 3 = ☐ and 3 - 6 = ☐ on the chalkboard. Draw 6 circles on the chalkboard. Ask a student to erase 3 circles. Say, "How much is 6 - 3?" (3) Draw 3 circles on the chalkboard and ask a student to erase 6 of them. When it is discovered that 6 cannot be taken away from 3 say, "Subtraction is not like addition. If we change the order of the numbers we will not get the same answer."

Repeat this procedure with other subtraction examples.

2.03.06.02 **use a table to discover the inverse relationship between addition and subtraction**

STRATEGY 1: Prepare and distribute interlocking cubes and an addition table to each student or group of students.

e.g.,

+	0	1	2	3	4	5
0	0	1	2	3	4	5
1	1	2	3	4	5	6
2	2	3	4	5	6	7
3	3	4	5	6	7	8
4	4	5	6	7	8	9
5	5	6	7	8	9	10

Say, "Take four cubes and three cubes and lock them

STRATEGY 1: cont'd

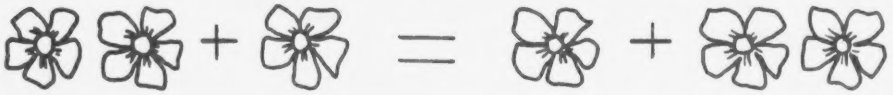
together. Who can write a number sentence to show this on the chalkboard? (4 + 3 = 7) Look at your addition chart. Find the sum of 4 + 3 by placing one finger on the 4 to the left side of the table and another finger on the 3 at the top. Move your fingers across and down until they meet." When you reach the sum of the numbers (7), say, "Now, let's start at 7 and move straight up to the top row to 4. Subtract 4 from 7. Now move across the chart to the left of the 7 and find 3. Therefore 7 - 4 = 3. We can see that subtraction is the opposite or the inverse of addition."

Repeat this procedure using other examples.

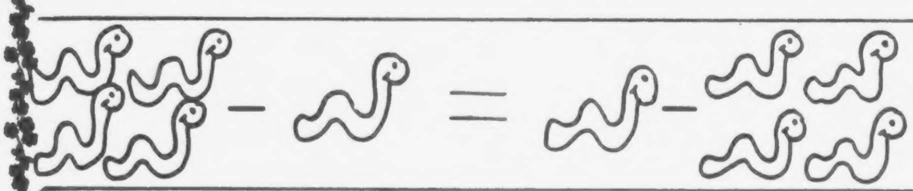
P.O. 2.03.06.01

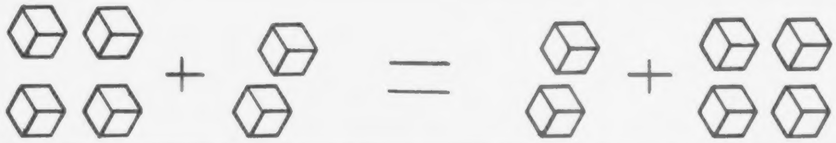
NAME:________________ CLASS:________ DATE:________

Read each number sentence. If it is true, write yes in the box. If it is not true, write no in the box.



yes





4 + 1 = 1 + 4

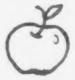
6 + 2 = 2 + 7

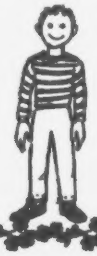
4 − 1 = 1 − 4

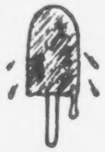
5 − 3 = 3 − 5

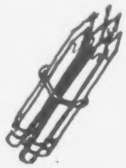
DO YOU REMEMBER?

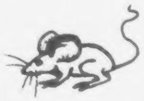
Circle the items you would weigh in ounces.

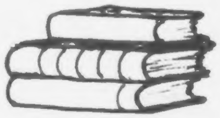












P.O. 2.03.06.02

NAME:________________________ CLASS:________ DATE:________

Use the table to find the opposite of each number sentence below. Write the opposite number sentence.

+	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
0	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9	10
2	2	3	4	5	6	7	8	9	10	11
3	3	4	5	6	7	8	9	10	11	12
4	4	5	6	7	8	9	10	11	12	13
5	5	6	7	8	9	10	11	12	13	14
6	6	7	8	9	10	11	12	13	14	15
7	7	8	9	10	11	12	13	14	15	16
8	8	9	10	11	12	13	14	15	16	17
9	9	10	11	12	13	14	15	16	17	18

① 3 + 4 = 7

7 - 4 = 3

② 9 - 3 = 6

③ 13 - 7 = 6

④ 8 + 4 = 12

⑤ 12 - 7 = 5

⑥ 7 + 9 = 16

⑦ 14 - 9 = 5

⑧ 7 + 8 = 15

⑨ 9 - 5 = 4

⑩ 5 + 6 = 11

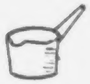
2.10.13 CUP, PINT, QUART

(1-2 lessons)

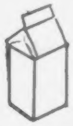
PERFORMANCE OBJECTIVES

The student will be able to...

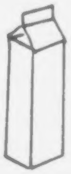
2.10.13.01A identify the relationships among cup, pint and quart;
e.g.,



cup



pint



quart

*2.10.13.02A estimate and measure capacity using different customary units.
e.g.,

2.10.13

VOCABULARY

TERMS

cup
pint
quart

GETTING STARTED

Display standard containers of varying sizes. Ask the students to arrange the containers in size order from smallest to largest and then from largest to smallest.

Prepare and display a small container, a large container, and a pitcher of water. Say, "How many times do you think I can fill the small container and pour it into the large one?" Record the estimates on the chalkboard. Ask several students to take turns pouring until the large container is filled. Say, "How many times did we fill the small container and pour it into the large container? Whose guess was closest?"

2.10.13

2.10.13.01 **identify the relationships among cup, pint and quart**

STRATEGY 1: Prepare two quart containers, a pint container and a one cup container. Label all but one quart container and fill that container with water. Display the cup and the pint container and identify them. Ask a student to fill the cup with water and pour it into the pint container. Say, "Is the pint container full? (No) How many more cups do you think will fill the pint?" (1) Ask a student to fill the pint container with another cup of water. Is the pint container full?" (Yes) Repeat this procedure for the quart using the cup and then the pint. Say, "How many pints filled the quart? (2 pints filled the quart.) How many cups filled the quart? (4 cups filled the quart.) Two cups filled a pint, two pints filled a quart, and four cups filled a quart." Write the relationships on a chart to be displayed in the classroom.

STRATEGY 2: Display and label a one quart container, two pint containers, and four measuring cups. Fill the quart container with water. Say, "How many pint containers can we fill from this quart container?" Fill the pint containers. Say, "How many pints did we fill? (A quart filled 2 pints.) How many cups can we fill from this pint container?" Fill the cups. Say, "How many cups did we fill?" (A pint filled 2 cups.) Pour the water back into the quart container. Say, "How many cups can we fill from the quart container?" Fill the cups. Say, "How many cups did we fill?" (A quart filled 4 cups.)

Construct a chart on the chalkboard to record the results.

2.10.13

STRATEGY 2: cont'd

e.g.,

1 pint = __________ cup(s)
1 quart = __________ pint(s)
2 pints = __________ quart(s)
1 quart = __________ cup(s)
2 cups = __________ pint(s)
4 cups = __________ quart(s)

2.10.13.02 **estimate and measure capacity using different customary units**

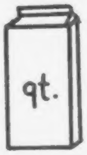
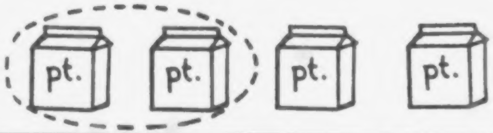
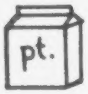
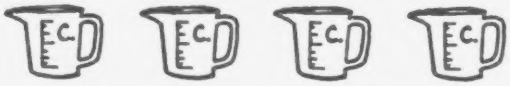
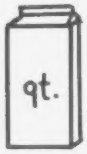
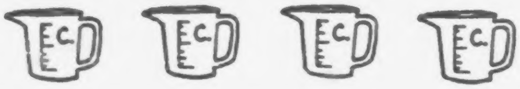
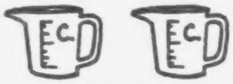
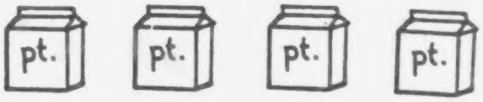
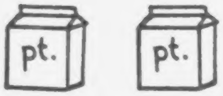
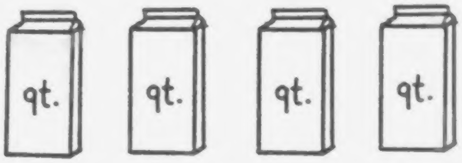
STRATEGY 1: Prepare cup, pint, and quart containers varying in shape and size, labels for each, and a pitcher of water. Display the quart container. Say, "How many cups do you think this container will hold?" Write several guesses on the chalkboard. Ask a student to fill the cup with water and pour it into the quart container. Say, "Is this container full? (No) How many more cups do you think we need to fill this container?" Repeat this procedure until the container is full. Say, "How many cups filled this container? (4) Which container holds four cups? (A quart holds 4 cups.) We call this bottle a quart bottle." Ask a student to find the appropriate label and tape it to the container.

Repeat this procedure using the other containers.

P.O. 2.10.13.01

NAME:______________________ CLASS:________ DATE:________

Look at the items in Column A. Circle the number of items in Column B that are equal to the item(s) in Column A.

COLUMN A	COLUMN B
	
	
	
	
	

DO YOU REMEMBER?

$3 + 7 = \square + 3$

$4 + 0 = 0 + \square$

$\square + 5 = 5 + 3$

$6 + \square = 4 + 6$

$2 + 7 = 7 + \square$

$1 + 8 = \square + 1$

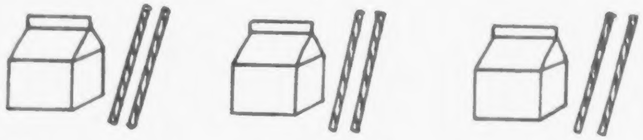
2.13.04 PATTERNS

(2 lessons)

PERFORMANCE OBJECTIVES

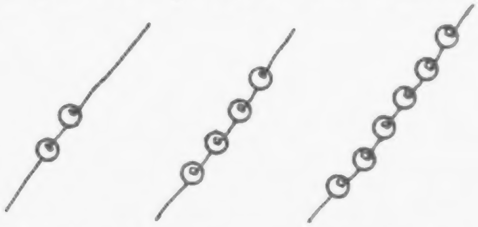
The student will be able to...

2.13.04.01A create and explain a pattern using concrete material;
e.g.,



"One milk container and two straws..."

2.13.04.02A complete a picture pattern and state the rule;
e.g.,



Rule: Add two more beads to each successive string.

2.13.04.03A complete a numerical pattern and state the rule.
e.g.,

1, 3, 5, 7, ☐ Rule: Add two to the previous number.

10, 8, 6, 4, ☐ Rule: Subtract two from the previous number.

378

616

2.13.04

VOCABULARY

TERMS

pattern
rule

GETTING STARTED

Draw a circle on the chalkboard. Say, "How many circles do you see?" (one) Draw two circles under the first one and say, "How much is one and one more?" (2) Place three circles under the two circles and say, "How much is two and one more?" (3)
e.g.,

o 1
o o 1 + 1
o o o 2 + 1

Repeat this procedure of adding circles until you have six circles. The students will see a developing step pattern as one more circle is added each time. Say, "How will the next step look?"

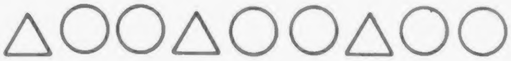
Prepare and display circles of various sizes and colors. Say, "What is the same about these shapes? How are they different? Which two circles are the same size and color. Which two circles are the same size but different colors?"

2.13.04

2.13.04.01 **create and explain a pattern using concrete material**

STRATEGY 1: Prepare a flannel board, flannel circles and triangles and paper circles and triangles. Distribute the paper triangles and circles to each student or group of students. Display a pattern on the flannel board.

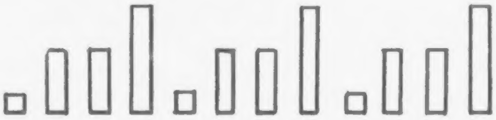
e.g.,



Say, "What would be the next 3 objects? (one triangle, two circles) How do you know? (A pattern is shown already.) Explain. (We can see one triangle, two circles, one triangle, two circles.) A pattern must always follow a rule. Use your triangles and circles to make a different pattern." Ask the students to show and explain their patterns or to guess the rule for another student's pattern.

STRATEGY 2: Prepare and distribute colored rods to each student. Ask the students to describe or to say the rule for a pattern created with colored rods.

e.g.,



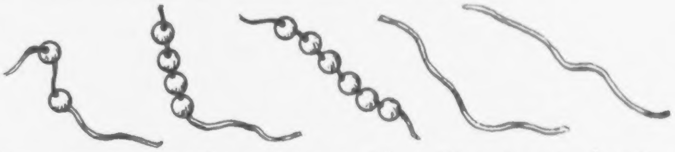
Say, "A pattern always follows a rule. Use your rods to make a pattern. Explain your pattern and state the rule."

2.13.04

2.13.04.02 complete a picture pattern and state the rule

STRATEGY 1: Prepare and display strands of beads.

e.g.,

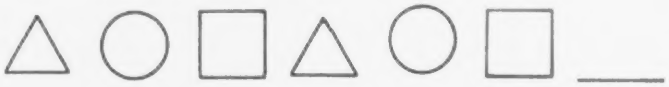


Say, "How many beads are on the first string? (2) ...the second string? (4) ...the third string? (6) What pattern do you see? State your rule and explain. (If we add two beads each time we get the number of beads on the next string.) How many beads will be on the fourth string? (8 since 2 more beads than 6 is 8.) Ask a student to string 8 beads. Say, "How many beads will be on the next string? (10) What is the rule for finishing this pattern?" (Add two more beads to each successive string.)

Repeat this procedure of having students string several strands of beads and establish a pattern as other students state the rule for each pattern.

STRATEGY 2: Draw several shapes on the chalkboard.

e.g.,



Say, "What shape comes next? (triangle) How do you know?" Elicit that the pattern is triangle, circle, square. Therefore, a triangle comes next. Ask several students to come to the chalkboard to fill in the missing shapes to continue the pattern. Ask a student to state the rule.

Repeat this procedure using other shapes and patterns.

2.13.04

2.13.04.03 **complete a numerical pattern and state the rule**

STRATEGY 1: Prepare counting objects such as discs, buttons, or beans. Write a number pattern on the chalkboard.

e.g.,

3, 6, 9, 12, ___, ___, ___

Distribute the counting objects. Say, "Show groups of 3, 6, 9, and 12 objects on your desk. Is there a pattern? Explain. (Yes, 3 objects were added to each group to make the next group in the pattern.) What is the rule for this pattern? (Count forward by 3 or add 3 to each group to get the next group.) How many objects will be in the next group?" (15) Ask several students to complete the number pattern.

Repeat this procedure using other number patterns.

STRATEGY 2: Write the pattern, 10, 8, 6, 4, ___ on the chalkboard. Say, "Do the numbers get larger or smaller? (smaller) Is there a pattern shown by these numbers? Explain. (To go from the first number to the second number, you subtract 2, to go from the second number to the third number, you subtract 2, ...) What is the rule for this pattern?" (Subtract 2 or count backward by 2 to go from one number to the next number.)

Repeat this procedure, completing other number patterns and asking the students to state the rules.

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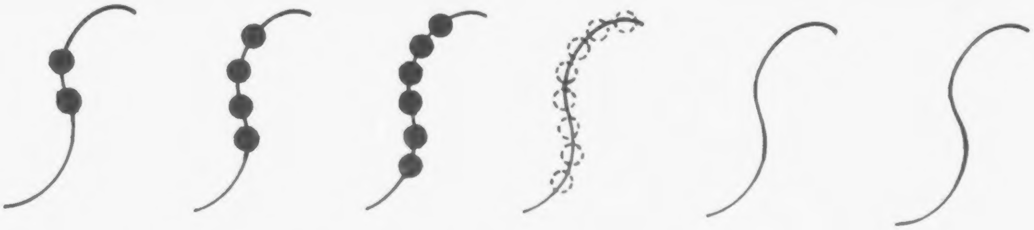
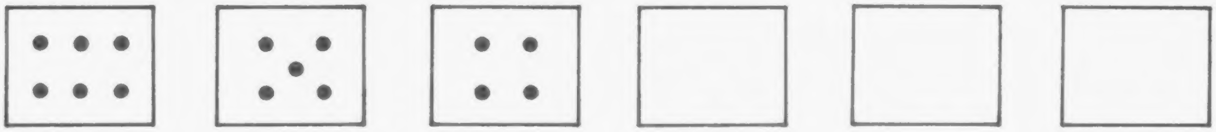
P.O. ____________

NAME: 2.13.04.01 ______________________________ CLASS: ________ DATE: ______

Complete each pattern. Write the rule.



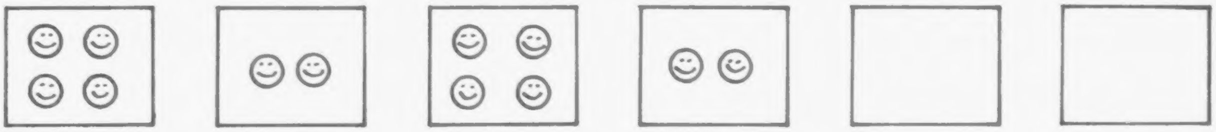
Rule: Add two beads.



Rule: ______________________________

△△○□△△○□ ___ ___ ___ ___

Rule: ______________________________

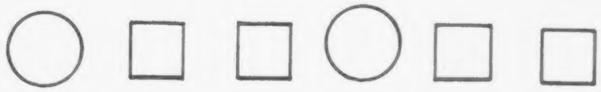


Rule: ______________________________

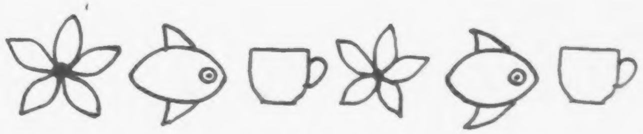
P.O. 2.13.04.02

NAME: ______________________ CLASS: ________ DATE: ________

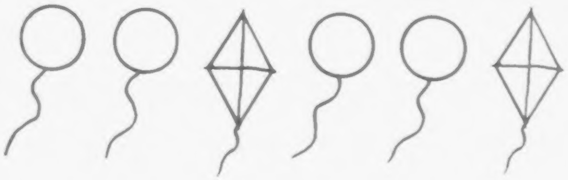
Complete each pattern. Write the rule.



Rule: circle, square, square



Rule: ______________________



___ ___ ___ ___

Rule: ______________________

DO YOU REMEMBER?

Forty-six newspapers were sold on Monday, 28 were sold on Tuesday, and 57 were sold on Wednesday.

How many newspapers were sold on Monday and Wednesday?

________ newspapers

How many newspapers were sold on Tuesday and Wednesday?

________ newspapers

P.O. 2.13.04.03

NAME: ____________________ CLASS: __________ DATE: __________

Complete each pattern. Write the rule.

15, 12, 9, 6, $\boxed{3}$

Rule: Subtract 3.

20, 22, 24, 26, ☐

Rule: ____________________

1, 3, 5, 7, ☐

Rule: ____________________

20, 15, 10, ☐

Rule: ____________________

10, 20, 30, 40, 50, ☐

Rule: ____________________

2.02.07 ADDITION OF 2- AND 3-DIGIT NUMBERS WITH REGROUPING (EXCHANGE) ONES TO TENS

(2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

2.02.07.01B add a 3-digit number and a 2-digit number with regrouping (exchange) using expanded notation;

e.g.,

$$\begin{array}{rcrcrcrcrc}
469 & = & 400 & + & 60 & + & 9 & & & \\
\div\ 27 & = & + & & 20 & + & 7 & & & \\ \hline
 & & 400 & + & 80 & + & 16 & & & = \\
 & & 400 & + & 80 & + & 10 & + & 6 & = \\
 & & 400 & + & (80 & + & 10) & + & 6 & = \\
 & & 400 & + & & 90 & & + & 6 & = \\
 & & & & & 496 & & & &
\end{array}$$

2.02.07.02B add a 3-digit number and a 2-digit number with regrouping (exchange) and check;

e.g.,

$$\begin{array}{r} 469 \\ +\ 27 \\ \hline 496 \end{array} \qquad \begin{array}{r} \underline{\text{check}} \\ 27 \\ +469 \\ \hline 496 \end{array}$$

2.02.07.03B compute addition examples with regrouping (exchange) using money through $9.99 and check;

e.g.,

$$\begin{array}{r} \$1.26 \\ +\ .48 \\ \hline \$1.74 \end{array} \qquad \begin{array}{r} \underline{\text{check}} \\ \$\ .48 \\ 1.26 \\ \hline \$1.74 \end{array}$$

2.02.07.04B solve story problems related to skills learned in this module.

e.g.,

Mary had 126 marbles. Susan had 48 marbles. How many marbles did the girls have in all?

$$\begin{array}{r} 126 \\ +\ 48 \\ \hline 174 \end{array}\ \text{marbles} \qquad \begin{array}{r} \underline{\text{check}} \\ 48 \\ +126 \\ \hline 174 \end{array}$$

2.02.07

VOCABULARY

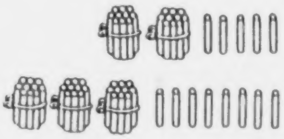
TERMS

regrouping
digit
sum
total

GETTING STARTED

Prepare and display squared material or bundles of sticks and write a corresponding example on the chalkboard.

e.g.,



25 = 2 tens + 5 ones
+38 = +3 tens + 8 ones

Say, "How many ones are displayed altogether? (13) How can we regroup the 13 ones? (We can make 1 group of 10 and 3 ones.) How many tens will we have then? (6) How many ones will we have?" (3) Write the answer 6 tens + 3 ones = 63 on the chalkboard.

Repeat this procedure using other examples.

Say, "Ms. Long made 36 brownies and 15 blondies for the party. How many cakes did she make? What operation can be used to solve this problem? Explain." Elicit and write $\begin{array}{r}36\\+15\\\hline\end{array}$ on the chalkboard. Say, "What do we add first? (the ones column) How many ones are there? (11) Can we write 11 in the ones column? (No.) What can we do? (Place 1 in the ones column and regroup ten ones for one ten which is then placed in the tens column.) What will we do next? (Add the tens in the tens column.) How many tens are there? (5) What is the total number of cakes that Ms. Long made?" (Ms. Long made 51 cakes.)

Repeat this procedure using other story problems.

2.02.07

2.02.07.01 **add a 3-digit number and a 2-digit number with regrouping (exchange) using expanded notation**

STRATEGY 1: Prepare and distribute squared material or sticks in hundreds and tens and some loose sticks to represent ones. Present a problem involving addition.

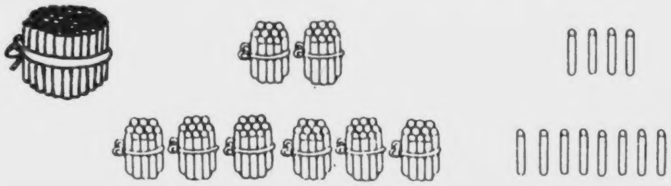
e.g.,

> John has one hundred twenty-four baseball cards and sixty-eight football cards. How many cards does he have in all?

Say, "What do we want to find out in this problem? (How many cards does John have in all?) How will we solve it? (addition) Why?" Ask a student to write the addition example on the chalkboard as students use the sticks to display 124 and 68.

e.g.,

$$\begin{array}{r} 124 \\ +\underline{\ \ 68} \end{array}$$



Ask a student to write the expanded form on the chalkboard as the appropriate bundles of sticks are pointed out.

e.g.,

$$\begin{array}{rcrcrcrcr} 124 & = & & 100 & + & 20 & + & 4 \\ +\underline{\ \ 68} & = & + & & & 60 & + & 8 \\ \hline & & & 100 & + & 80 & + & 12 \end{array}$$

Say, "Can we put a 2-digit number in the the ones place? (No.) What must we do?" (Exchange ten ones for one ten.) Demonstrate. Complete the addition example on the chalkboard.

2.02.07

STRATEGY 1: cont'd

e.g.,

$$
\begin{array}{rrcrcrcl}
124 = & 100 & + & 20 & + & 4 & & \\
+\underline{\;68} = & + & & 60 & + & 8 & & \\
\hline
 & 100 & + & 80 & + & 12 & & = \\
 & 100 & + & 80 & + & 10 + 2 & & = \\
 & 100 & + & \multicolumn{3}{c}{\underbrace{(80 + 10)}_{90}} & + 2 & = \\
 & 100 & + & \multicolumn{3}{c}{90} & + 2 & = \\
 & & & \multicolumn{3}{c}{192} & &
\end{array}
$$

Say, "How many cards does John have altogether?" (John has 192 cards altogether.)

Repeat this procedure of adding other 3-digit numbers and 2-digit numbers with regrouping using expanded notation.

2.02.07.02 **add a 3-digit number and a 2-digit number with regrouping (exchange) and check**

STRATEGY 1: Prepare and distribute squared material (hundreds, tens, and ones) to each student or group of students. Present a word problem.

e.g.,

> Mother baked one hundred twenty-seven chocolate cookies and fifty-seven vanilla cookies. How many cookies did she bake all together?

Say, "What do we want to find out in this problem? (how many cookies Mother baked) How do we solve the problem? (addition) Why?" Ask a student to write the addition example on the chalkboard, e.g., $\begin{array}{r} 127 \\ +\underline{\;57} \end{array}$.

Say, "Use your squared material to show 127 and 57. (Demonstrate.) In the number one hundred twenty-seven, how many hundreds are there? (1) ...tens?

STRATEGY 1: cont'd

(2) ...ones?" (7) Repeat this procedure for fifty-seven. Say, "How many ones are there in all? (14) Can we write 14, a 2-digit number, in the ones place? (No.) What must we do?" (Exchange ten ones for one ten.) Demonstrate as the students use the squared material to show the exchange at their desks. Say, "Now how many ones do you have? (4) ...tens? (8) ...hundreds? (1) Let's complete the addition example."

e.g.,

$$\begin{array}{r} 1\overset{1}{2}7 \\ +\ 57 \\ \hline 184 \end{array}\ \text{cookies}$$

Say, "Therefore, Mother baked 184 cookies. How can we check our answer to the arithmetic example?" Ask a student to write the check at the chalkboard.

e.g., check

$$\begin{array}{r} \overset{1}{5}7 \\ +127 \\ \hline 184 \end{array}$$

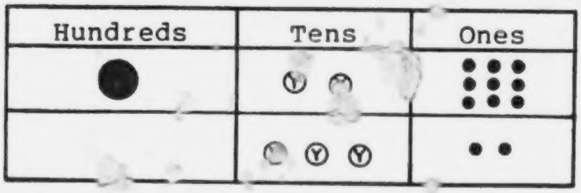
Say, "Are the answers the same? (Yes.) Then we are probably correct. Mother baked 184 cookies all together."

Repeat this procedure using similar examples.

STRATEGY 2: Prepare and display paper circles in three colors, backed with tape. Say, "The red circles represent hundreds, the yellow circles represent tens, and the blue circles represent ones." Label three columns on the chalkboard; hundreds, tens, and ones respectively. Ask a student to place the colored circles in the columns to show 1 hundred, 2 tens, and 9 ones and to write the number 129 to the right of the circles. Repeat this procedure by asking another student to represent the number 32.

STRATEGY 2:
cont'd

e.g.,



$$\begin{array}{r} 129 \\ +\ \underline{32} \end{array}$$

Say, "Let's use the circles to complete the example. How many ones do we have in all? (11) Can we write 11 ones in the ones place? (No.) What must we do?" (Exchange ten ones for one ten.) Demonstrate the exchange of the circles and add the numbers in the ones column at the chalkboard, showing the regrouping.

e.g.,

$$\begin{array}{r} 1 \\ 129 \\ +\ \underline{32} \\ 1 \end{array}$$

Say, "Now how many tens do we have?" (6) Add the tens column and then the hundreds column.

e.g.,

$$\begin{array}{r} 1 \\ 129 \\ +\ \underline{32} \\ 161 \end{array}$$

Say, "The sum of 129 and 32 is 161. How can we check our answer?" (We can check our answer by reversing the addends and adding again.) Ask a student to reverse the paper circles, placing those representing the first addend below those representing the second addend, and add to check the answer.

Repeat this procedure using other 3-digit and 2-digit numbers.

2.02.07

2.02.07.03 **compute addition examples with regrouping (exchange) using money through $9.99 and check**

STRATEGY 1: Prepare and distribute play money (dollars, dimes and pennies) to each student or group of students. Say, "Maria has two dollars and twenty-seven cents. Her sister has forty-six cents. How much money do both girls have?" Ask the students to show the amount of money each girl has. Write both amounts on the chalkboard.

e.g.,

$$\begin{array}{r}\$2.27\\ .46\\ \hline\end{array}$$

Say, "How can we find out how much money Maria and her sister have in all? (by adding) Why? Let's add both amounts. How many pennies are there? (13) How many dimes? (6) How many dollars? (2) Can we write 13 pennies in the ones column? (No.) Why not? What must we do?" (Exchange ten pennies for one dime.)

Ask the students to show the exchange with the play money as you demonstrate. Say, "Now how many pennies are there? (3) How many dimes? (7) How many dollars?" (2) Add the numbers in the example on the chalkboard.

e.g.,

$$\begin{array}{r}\$2.\overset{1}{2}7\\ +\ .46\\ \hline \$2.73\end{array}$$

Say, "How much money do the girls have together? (Together the girls have $2.73.) How can we check our arithmetic example?" (We can check by reversing the addends to see if our answer is correct.) Ask a student to check the answer at the chalkboard.

STRATEGY 1: cont'd

e.g.,

$$\begin{array}{r} \underline{\text{check}} \\ \overset{1}{} \\ \$\ .46 \\ +\ \underline{2.27} \\ \$2.73 \end{array}$$

Repeat this procedure using other amounts through $9.99.

2.02.07.04 **solve story problems related to skills learned in this module**

STRATEGY 1: Present a story problem.

e.g.,

> Last week the second grade went to the Bronx Zoo. One-hundred seventeen boys and seventy-five girls went on the trip. How many second graders went to the Bronx Zoo?

Say, "What do we want to find out in this problem? (How many second graders went to the zoo?) How can we solve this problem? (add) How can we tell?" Ask a student to write the addition example on the chalkboard.

e.g.,

$$\begin{array}{rl} 117 & \text{boys} \\ \underline{+\ 75} & \text{girls} \end{array}$$

Say, "Which numbers do we add first? (the numbers in the ones column) How much is seven plus five? (12) May we write that number in the ones place? (No.) Why not? What must we do? (Exchange ten ones for one ten.) Now, what number may we write in the ones place? (2) Let's add the tens column. What numbers will we add? (1 plus 7 plus the 1 from

STRATEGY 1: cont'd

the regrouping) What is the total? (9) Now, let's add the hundreds. How many hundreds are there? (1) What is the sum?" (192) Ask a student to write the answer. (192 second graders went to the Bronx Zoo.)

Say, "How can we check our example?" (Reverse the addends and add again.) Ask a student to reverse the addends and find the sum on the chalkboard.

e.g., check

$$\begin{array}{rl} 75 & \text{girls} \\ +\underline{117} & \text{boys} \\ 192 & \text{second graders} \end{array}$$

Repeat this procedure using other story problems.

STRATEGY 2: Prepare and display a menu.

e.g.,

Willie's Fast Foods	
burger	$1.39
fries	$ .37
cheeseburger	$1.46
soda	$ .28

Say, "Harry went to Willie's Fast Foods for lunch. He had a cheeseburger and a soda. How much did Harry spend? How can we solve this problem?" (add) Ask a student to write the amount of each item that Harry bought on the chalkboard.

e.g.,

$$\begin{array}{rl} \$1.46 & \text{cheeseburger} \\ +\ \underline{.28} & \text{soda} \end{array}$$

Say, "Which column will we add first? (ones) How much is eight plus six? (14) Can we write fourteen in the one's column? (No.) What must we do? (Exchange ten pennies for one dime.) If we do that how many pennies do we have now? (4) Write 4 in the

STRATEGY 2: cont'd

ones column and complete the addition. Say, "How much did Harry spend? (Harry spent $1.74.)

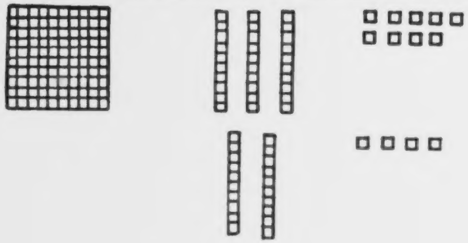
To check our example, what must we do?" (Reverse the addends and add again.) Ask a student to reverse the addends and complete the addition at the chalkboard. Remind the students that a dollar sign and a decimal point must be included in the answer.

Repeat this procedure using other items on Willie's Fast Foods menu.

P.O. 2.02.07.01

NAME: ____________________ CLASS: ________ DATE: ________

Solve each example using expanded notation.

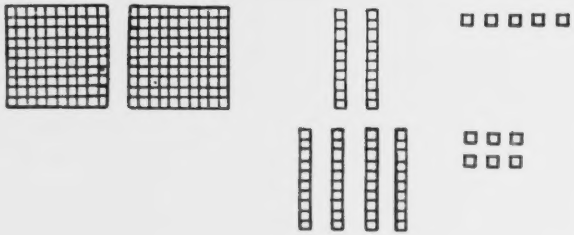


139 = 100+30+9

+ 24 = + 20+4

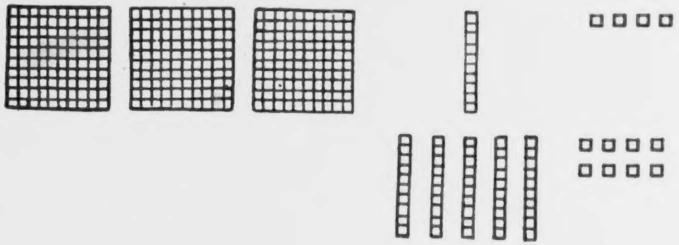
100+50+13

100+60+ 3=163



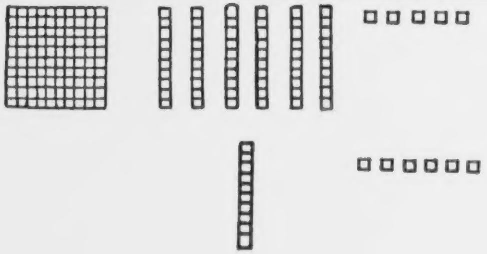
225 =

+ 46 =



314 =

+ 58 =



165 =

+ 16 =

P.O. 2.02.07.02

NAME:______________________________CLASS:________DATE:________

Solve each addition example and check.

Solve

$$\begin{array}{r} 367 \\ +\ 25 \\ \hline 392 \end{array}$$

Check

$$\begin{array}{r} 25 \\ +367 \\ \hline 392 \end{array}$$

Solve

$$\begin{array}{r} 236 \\ +\ 46 \\ \hline \end{array}$$

Check

Solve

$$\begin{array}{r} 514 \\ +66 \\ \hline \end{array}$$

Check

Solve

$$\begin{array}{r} 55 \\ +229 \\ \hline \end{array}$$

Check

Solve

$$\begin{array}{r} 78 \\ +606 \\ \hline \end{array}$$

Check

DO YOU REMEMBER?

1 group of three = ______
2 groups of three = ______
3 groups of three = ______
4 groups of three = ______
5 groups of three = ______

P.O. 2.02.07.03

NAME: ____________________ **CLASS:** ________ **DATE:** ________

Use the price list to solve each example.
Check your answers.

Price List

Bread	$1.19	Soda	$.55
Milk	$1.26	Eggs	$.69
Coffee	$2.39	Butter	$.47
Chicken	$3.45	Soup	$.29

Solve
$1.19 Bread
+ .69 Eggs
$1.88

Check
$ .69
+ 1.19
$1.88

Solve
$2.39 ______
+ .55 ______

Check

Solve
$1.26 ______
+ .29 ______

Check

Solve
$1.19 ______
+ .47 ______

Check

Solve
$2.39 ______
+ .47 ______

Check

Solve
$3.45 ______
+ .29 ______

Check

Solve
$3.45 ______
+ .47 ______

Check

Solve
$1.26 ______
+ .55 ______

Check

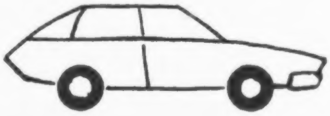
P.O. 2.02.07.04

NAME:____________________ CLASS:________ DATE:_______

Solve each story problem and check.

I counted 113 cars.
My brother counted 77 more cars.
How many cars did we count in all?

Solve Check

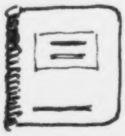


Maria counted 154 roses and
29 daisies in her garden.
How many flowers did she count
in all?

Solve Check

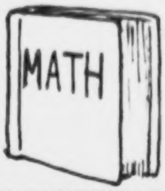
I bought a notebook for $1.57
and a box of crayons for $.39.
How much did I spend in all?

Solve Check



My poetry book has 24 pages.
My math book has 168 pages.
How many pages are there in
both books?

Solve Check



2.04.05 COMMUTATIVE PROPERTY OF MULTIPLICATION

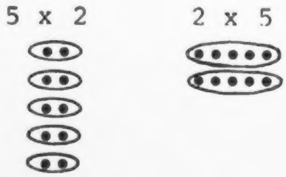
(1-2 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

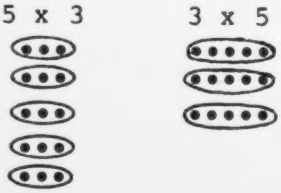
2.04.05.01A apply the commutative property of multiplication to the two times table through 5 groups of two;
e.g.,

5 x 2 = 10
2 x 5 = 10
5 x 2 = 2 x 5



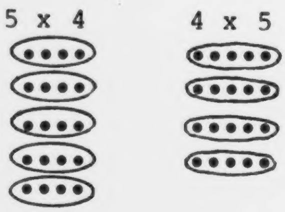
2.04.05.02B apply the commutative property of multiplication to the three times table through 5 groups of three;
e.g.,

5 x 3 = 15
3 x 5 = 15
5 x 3 = 3 x 5



2.04.05.03B apply the commutative property of multiplication to the four times table through 5 groups of four.
e.g.,

5 x 4 = 20
4 x 5 = 20
5 x 4 = 4 x 5



2.04.05

VOCABULARY

TERMS

commutative

GETTING STARTED

Ask ten students to stand in pairs at their desks. Ask one pair of students to come to the front of the room. Say, "Here are 2 students." Write 2 on the chalkboard. Ask another pair of students to come to the front of the room. Say, "Here are 2 more students." Write +2 next to the 2 on the chalkboard. Repeat this procedure until 5 pairs of students have come to the front of the room. Write 2 + 2 + 2 + 2 + 2 = 10. Say, "There are 5 groups of two. How can this be written as a multiplication example?" (5 x 2 = 10.) Write 5 x 2 = 10 on the chalkboard.

Repeat this procedure forming groups of three students and groups of four students.

Prepare and distribute a set of twenty chips, beans, or straws to each student or group of students. Say, "Use your chips (beans, straws) to show three groups of two. How many groups did you show? (3) How many chips are in each group? (2) How many chips are there in all? (6) How can this be written as a multiplication example?" Elicit and write 3 x 2 = 6 on the chalkboard. Ask the students to read the number sentence.

Repeat this procedure using other multiplication facts.

401

2.04.05

2.04.05.01 **apply the commutative property of multiplication to the two times table through 5 groups of two**

STRATEGY 1: Prepare and distribute ten chips, beans, or sticks to each student or group of students. Say, "Mrs. Green had five tables. She asked two students to sit at each table. Use your chips to show two students at each table, e.g., ●● ●● ●● ●● ●●. How many groups do you have on your desk? (5) How many chips are in each group? (2) How would you write that in a multiplication number sentence?" (5 x 2 = 10) Write 5 x 2 = 10 on the chalkboard. Say, "Is 5 x 2 equal to 2 x 5? Let's find out. You have shown 5 x 2. Now show 2 x 5, or 2 groups of 5, by rearranging your chips. Did you need more or fewer chips? (the same number) We have shown that 2 x 5 equals the same amount as 5 x 2." Write 5 x 2 = 2 x 5 on the chalkboard.

Repeat this procedure with 4 x 2 = 2 x 4, 3 x 2 = 2 x 3, and 1 x 2 = 2 x 1.

STRATEGY 2: Arrange six chairs in 3 groups of two. Ask six students to sit on these chairs. Say, "How many students do you see? (6) How many groups of chairs do you see? (3) How many students are in each group? (2) There are 3 groups of two students or 3 x 2. Let's rearrange these chairs." Rearrange the chairs into 2 groups of three. Say, "How many groups do you see now? (2) How many students are in each group? (3) There are 2 groups with three students (2 x 3) in each group. Is the total number of students the same? (Yes.) Therefore, 3 x 2 = 2 x 3." Write 3 x 2 = 6, 2 x 3 = 6, and 3 x 2 = 2 x 3 on the chalkboard.

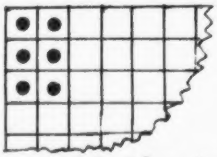
Repeat this procedure with 2 sets of two students, through 5 sets of two students.

2.04.05

2.04.05.02 **apply the commutative property of multiplication to the three times table through 5 groups of three**

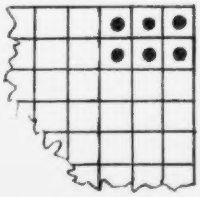
STRATEGY 1: Prepare and distribute large graph paper and 15 counters to each student or group of students. Say, "Place two chips in a horizontal row on your graph paper. Make 2 more rows of 2 chips each."

e.g.,



Say, "Let's count the total number of chips we used. (6) How many rows of chips do we have? (3) How many chips are in each row? (2) How can we write this as a multiplication example?" (We can write 3 rows of 2 chips as 3 x 2.) Write 3 x 2 = 6 on the chalkboard. Say, "Turn your graph paper around like this."

e.g.,



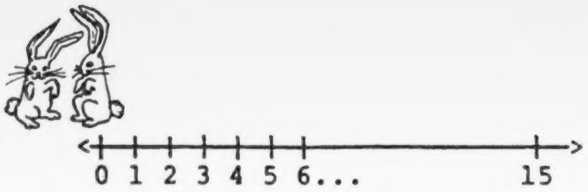
Say, "How many rows do you see now? (2) How many chips are in each row? (3) How many chips did we use? (6) We have two rows of three chips each. How can we write this as a multiplication example?" Elicit and write 2 x 3 = 6 under 3 x 2 = 6. Say, "What do you notice?" (2 x 3 and 3 x 2 are both equal to 6. Therefore they are also equal to each other.) Write 2 x 3 = 3 x 2 on the chalkboard.

Repeat this procedure for 1 x 3 and 3 x 1, 4 x 3 and 3 x 4, 5 x 3, and 3 x 5.

STRATEGY 2: Prepare and display a number line and two oaktag rabbits on the chalkboard.

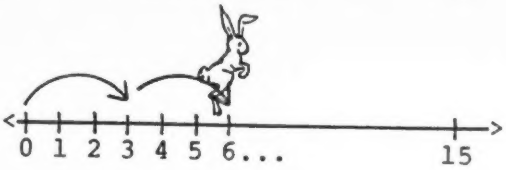
STRATEGY 2:
cont'd

e.g.,



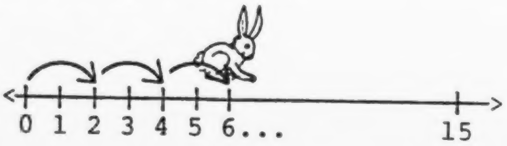
Say, "Mr. and Mrs. Rabbit decided to jump for carrots. Mr. Rabbit made two jumps of three spaces each.

e.g.,



How many carrots did Mr. Rabbit get? (Mr. Rabbit received six carrots because two jumps of three equal six.) Mrs. Rabbit wanted to get the same number of carrots as Mr. Rabbit. She made three jumps of two spaces each.

e.g.,



Did she get the same number of carrots?" (Yes, since three jumps of two also equal six.) Ask the students to write number sentences to show three jumps of two equals six and two jumps of three equal six. Elicit and write on the chalkboard:

Three jumps of two equals six.
$3 \times 2 = 6$

Two jumps of three equals six.
$2 \times 3 = 6$

Say, "What do you notice?" Elicit and write on chalkboard: $3 \times 2 = 2 \times 3$

Say, "In multiplication, just as in addition, the order of the numbers does not change the answer."

STRATEGY 2: cont'd Repeat this procedure using multiplication facts through five groups of three.

2.04.05.03 **apply the commutative property of multiplication to the four times table through 5 groups of four**

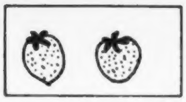
STRATEGY 1: Adapt Strategy 1 used in P.O. 2.04.05.01 or P.O. 2.04.05.02

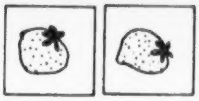
STRATEGY 2: Adapt Strategy 2 used in P.O. 2.04.05.01 or P.O. 2.04.05.02

P.O. 2.04.05.01

NAME: ________________ CLASS: ________ DATE: ________

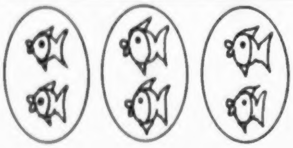
Complete each multiplication number sentence.

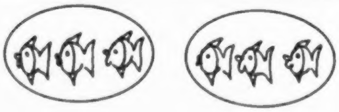




_1_ X _2_ = _2_   _2_ X _1_ = _2_

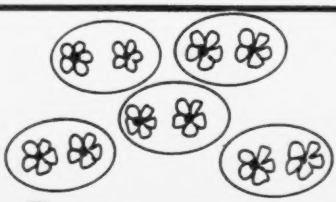
_1_ x _2_ = _2_ x _1_

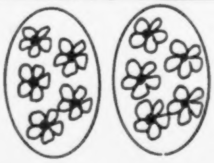




_3_ x ___ = ___   _2_ x ___ = ___

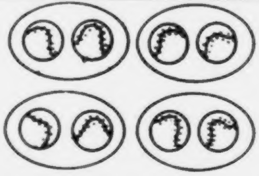
___ x ___ = ___ x ___

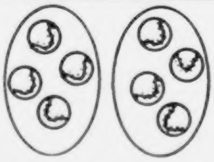




_5_ x ___ = ___   _2_ x ___ ___

___ x ___ = ___ x ___





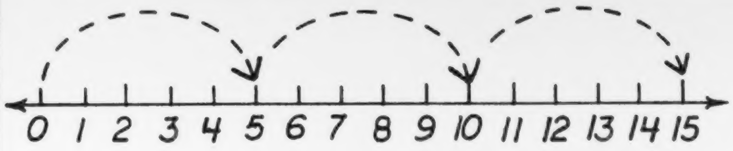
_4_ x ___ = ___   _2_ x ___ = ___

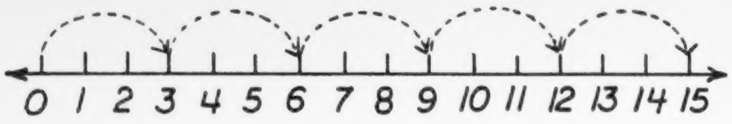
___ x ___ = ___ x ___

P.O. 2.04.05.02

NAME: ______________________ CLASS: ________ DATE: ________

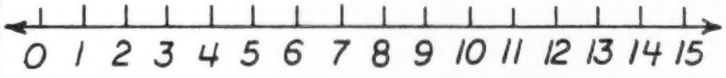
Draw the jumps on each number line.
Complete the multiplication number sentences.

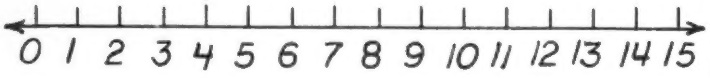

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15


0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

3 x 5 = ☐ 5 x 3 = ☐

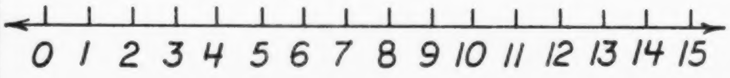
3 x 5 = 5 x 3


0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15


0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

3 x 2 = ☐ 2 x 3 = ☐

___ x ___ = ___ x ___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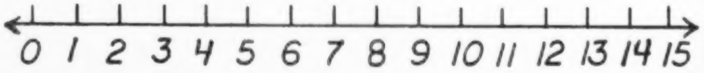

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

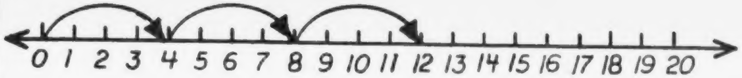
3 x 4 = ☐ 4 x 3 = ☐

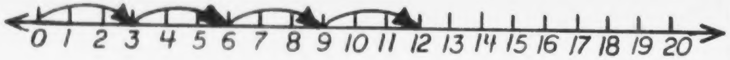
___ x ___ = ___ x ___

P.O. 2.04.05.03

NAME: ____________________ CLASS: ________ DATE: ________

Use the number lines to complete the multiplication number sentences.

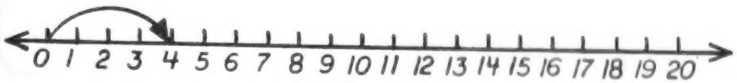

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

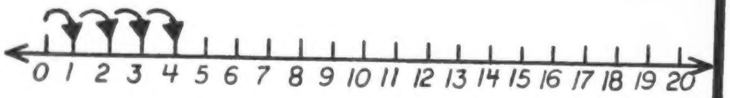

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

3 X 4 = 12

4 X 3 = 12

3 X 4 = 4 X 3

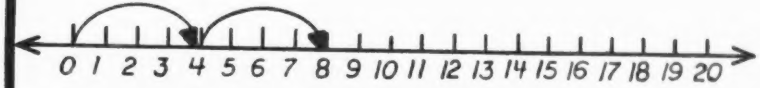

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

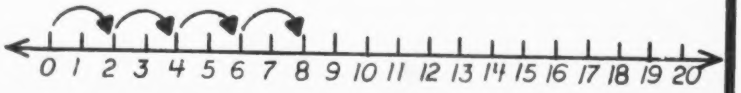

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

____ X ____ = ____

____ X ____ = ____

____ X ____ = ____ X ____


0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20


0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

____ X ____ = ____

____ X ____ = ____

____ X ____ = ____ X ____

2.05.06 DIVISION AND MULTIPLICATION AS INVERSE OPERATIONS

(1 lesson)

PERFORMANCE OBJECTIVES

The student will be able to...

2.05.06.01A recognize the division symbol (÷);
e.g.,

6 ÷ 3 = 2

2.05.06.02A recognize that multiplication and division are inverse (opposite) operations;
e.g.,

2 x 5 = 10 10 ÷ 2 = 5
5 x 2 = 10 10 ÷ 5 = 2

2.05.06.03A demonstrate related facts for number families.
e.g.,

2, 5, 10
2 x 5 = 10 10 ÷ 2 = 5
5 x 2 = 10 10 ÷ 5 = 2

2.05.06

VOCABULARY

TERMS	SYMBOLS
division	÷
inverse operation	

GETTING STARTED

Prepare and distribute ten interlocking cubes to each group of students. Say, "Joann has four cookies. She will share the four cookies equally between her two friends. How many cookies will each friend get?" Ask the students to pretend the cubes are cookies. Say, "How many cookies does Joann have? (4) How many friends will get cookies? (2) Let's use the cubes to see how many cookies each friend will get. (Demonstrate.) How many groups of cookies did you make? (2) How many cookies are in each group?" (2)

Repeat this procedure, separating up to ten cubes into smaller, equal groups of two, three, or five cubes.

Read a word problem to the students.
e.g.,

> Kelly has two boxes with three pencils in each box.
> How many pencils does she have in all?

Say, "What information is given in this problem? What do we want to find out? How will we solve it? (Multiply.) How do we know to multiply? What numbers will we multiply? (2 x 3) Why? How much is two times three? (6) How many pencils does Kelly have in all?" (Kelly has 6 pencils in all.)

Repeat this procedure using other word problems to review basic multiplication and division facts.

2.05.06

2.05.06.01 **recognize the division symbol (÷)**

STRATEGY 1: Write the symbols, +, -, x, and ÷ on the chalkboard. Say, "When we write number sentences we use symbols instead of words. (Point to the plus symbol.) How do we read this symbol? (plus) What does the plus symbol tell us to do?" (add) Repeat this procedure for the minus symbol (-) and the times symbol (x). Point to the division symbol. Say, "This symbol tells us to divide. It is used to show 1 group separated into several equal groups or sharing equally. Whenever we see this symbol we say, 'divided by.'" Write 6 ÷ 3 = 2 and 4 ÷ 2 = 2 on the chalkboard. Ask several students to read the examples on the chalkboard. Write the words under each example on the chalkboard.

Repeat this procedure using other examples.

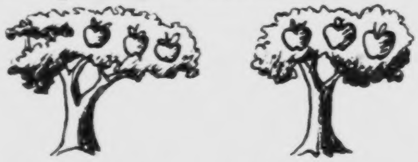
STRATEGY 2: Present a word problem.

e.g.,

There are six apples on two trees.
How many apples are on each tree?

Say, "What information is given in this problem? What do we want to find out? One way to solve this problem is by drawing two trees and dividing the six apples equally between them."

e.g.,



Say, "Another way to solve this problem is to write a division number sentence to represent the

STRATEGY 2: cont'd

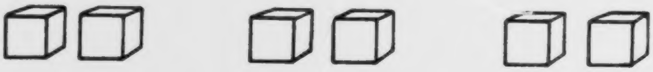
problem." Write 6 ÷ 2 = 3 on the chalkboard. Say, "A symbol with two dots and a line between them is used when writing division examples. We read that symbol as 'divided by'." Ask the students to show recognition of the division (÷) symbol by reading division examples from the chalkboard. Write the words that correspond to each example on the chalkboard.

2.05.06.02 **recognize that multiplication and division are inverse (opposite) operations**

STRATEGY 1:

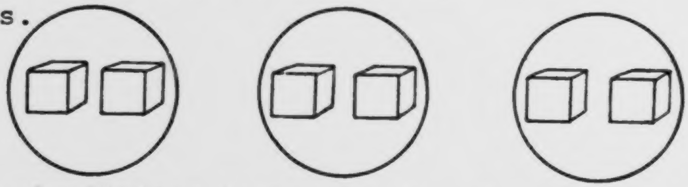
Prepare and distribute cubes to each student or group of students. Write 3 x 2 = ☐ on the chalkboard. Say, "Use your cubes to show this number sentence.

e.g.,



How much is three times two?" (6) Write 6 ÷ 3 = ☐ on the chalkboard. Ask a student to read the example aloud. Say, "Place 6 cubes together in one group on your desk. Divide the 6 cubes into 3 equal groups.

e.g.,



How much is six divided by three? (2) How are 3 x 2 = 6 and 6 ÷ 3 = 2 the same? (Both number sentences have the same numbers.) How are both examples different? (When we multiply, we join groups of equal amounts. When we divide, we separate a number of objects into equal groups.)

STRATEGY 1: cont'd

Multiplication and division are opposite operations. If three times two equals six, then the opposite is six divided by three equals two."

Repeat this procedure using other examples.

STRATEGY 2:

Prepare a multiplication word problem and a division word problem.

e.g.,

> If there are four bicycles and two wheels on each bicycle, how many wheels are there in all?
>
> If there are eight wheels and we have four bicycles, how many wheels will each bicycle have?

Ask one student to read the first problem aloud. How can this problem be solved? Elicit and write 4 x 2 = 8 on the chalkboard. Ask another student to read the second problem aloud. How can this problem be solved? Elicit and write 8 ÷ 4 = 2 on the chalkboard. Say, "Let's look at the two number sentences. What is the same in both examples? (the numbers) What is different? (The symbols and the order in which the numbers are written.) In both examples we have four bicycles, two wheels on each bicycle and eight wheels in all. In the first example we wanted to find out how many wheels there are in all, therefore we multiplied. In the second example we wanted to find the number of wheels on each bicycle, therefore we divided. We can say that multiplication and division are opposite operations. If four times two equals eight, then eight divided by four equals two."

Repeat this procedure using other multiplication and division examples.

2.05.06

2.05.06.03 **demonstrate related facts for number families**

STRATEGY 1: Prepare and display ten discs. Ask several students to do the following activities:

- Divide the discs into two equal groups.
- Elicit and record the corresponding number sentence. (10 ÷ 2 = 5)
- Write the inverse of 10 ÷ 2 = 5. (2 x 5 = 10)
- Divide the ten discs into five equal groups.
- Elicit and record the corresponding number sentence on the chalkboard. (10 ÷ 5 = 2)
- Elicit and record the inverse of 10 ÷ 5 = 2. (5 x 2 = 10)

Say, "What do you notice about all four number sentences? (They have the same three numbers; 2, 5 and 10.) We call these three numbers a number family."

Write another number family on the chalkboard, e.g., 3, 4, 12. Ask several students to write the multiplication and division facts for that family on the chalkboard.

Repeat this procedure using other number families, e.g., 3,4,12; 2,4,8; 3,2,6...

STRATEGY 2: Prepare and distribute fifteen counters or cubes to each student or group of students. Say, "Let's put three counters in each of two groups. How many counters in all?" (6) Ask a student to write a

STRATEGY 2: cont'd

corresponding number sentence on the chalkboard. (2 x 3 = 6) Say, "How else can we evenly group three counters? (Make three groups with two counters in each group.) How many counters in all?" (6) Ask another student to write the corresponding number sentence on the chalkboard. (3 x 2 = 6) Say, "Not let's divide six counters into two equal groups. How many counters are in each group?" (3) Ask another student to write the corresponding number sentence on the chalkboard. (6 ÷ 2 = 3)

Repeat this procedure for dividing six counters into 3 equal groups. (6 ÷ 3 = 2.)

Point to the four number sentences:

Building a Number Family with 6

2 x 3 = 6
3 x 2 = 6
6 ÷ 2 = 3
6 ÷ 3 = 2

Say, "What do you notice about all four facts? (All of the facts have the same numbers; 2, 3, and 6.) These three numbers all belong to a number family." Ask the students to use 15 counters to discover another number family with four related facts. Say, "What number facts can be discovered with the 15 counters?"

Building a Number Family with 15

2 x 3 = 6
3 x 2 = 6
6 ÷ 2 = 3
6 ÷ 3 = 2

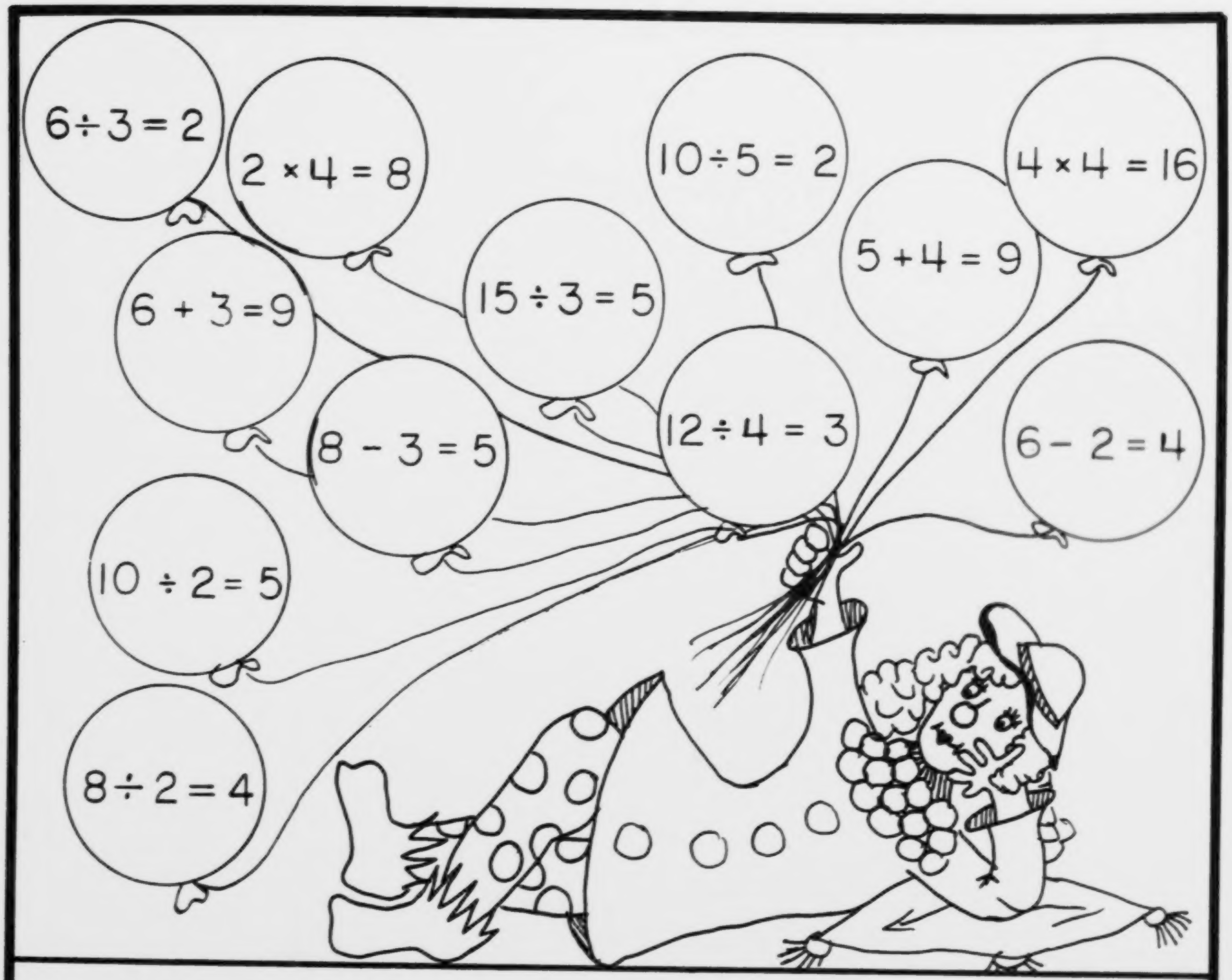
Say, What are the members of this number family?" (3, 5, 15) Have the students explain how the family members are related.

Repeat this procedure using other number families.

P.O. 2.05.06.01

NAME:________________________________ CLASS:__________ DATE:________

Color the balloons which show division number sentences.


6÷3=2
2×4=8
10÷5=2
4×4=16
5+4=9
15÷3=5
6+3=9
12÷4=3
8-3=5
6-2=4
10÷2=5
8÷2=4

DO YOU REMEMBER?

Solve

$$\begin{array}{r} 349 \\ +\ 24 \\ \hline \end{array}$$

Check

Solve

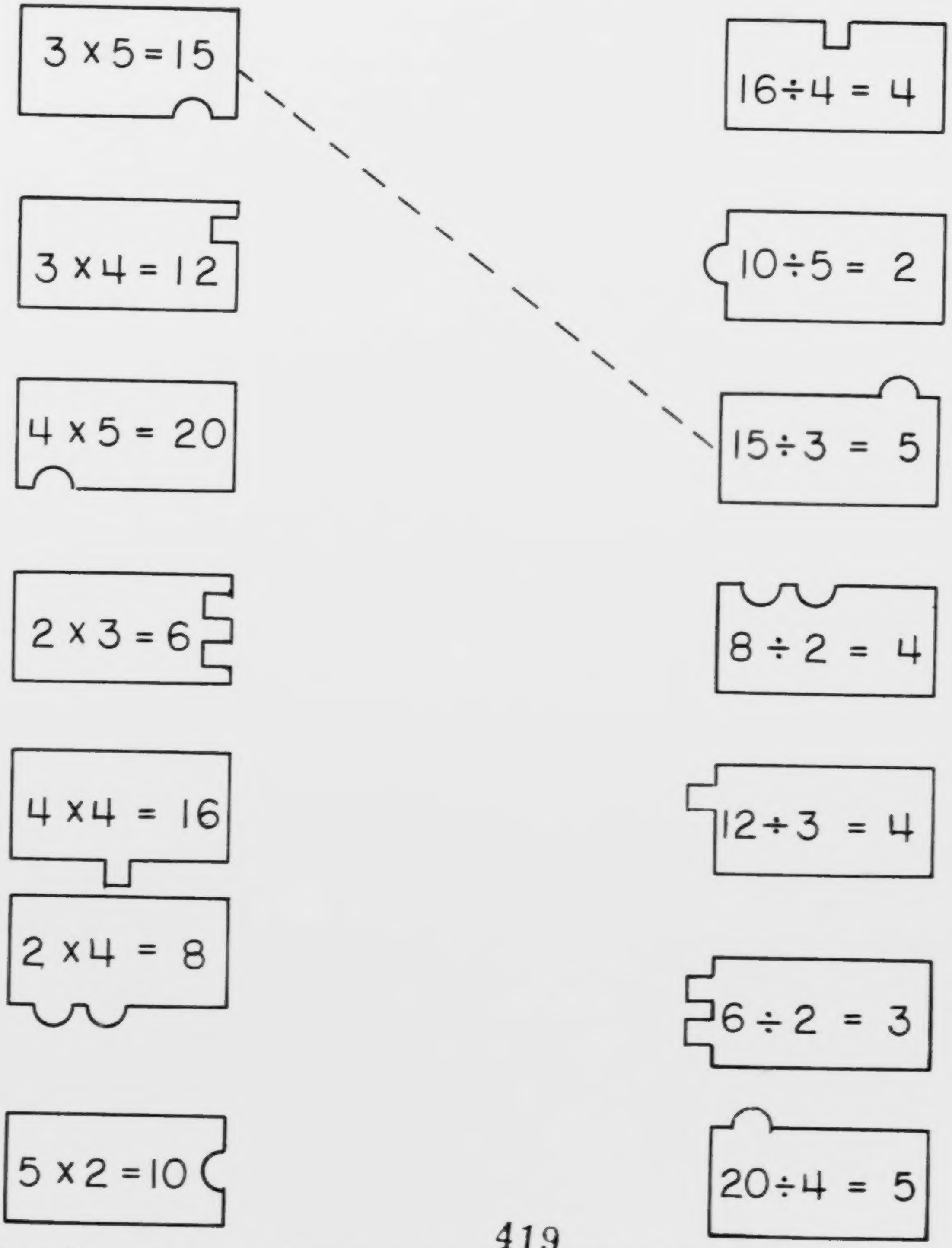
$$\begin{array}{r} 235 \\ +\ 55 \\ \hline \end{array}$$

Check

P.O. 2.05.06.02

NAME: ____________________ CLASS: __________ DATE: ________

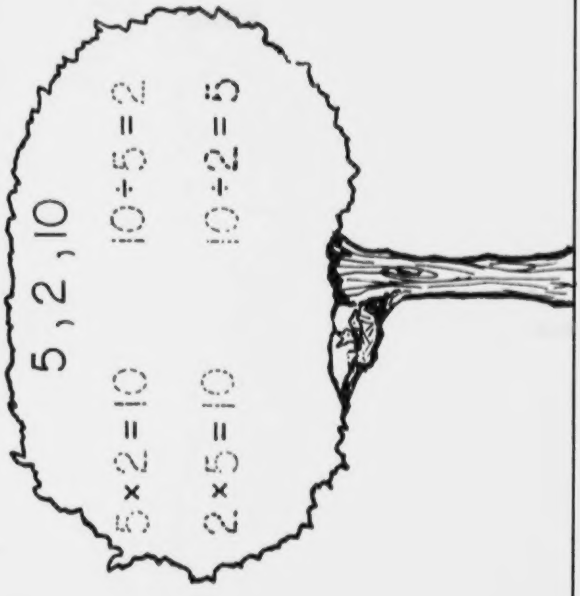
Match each puzzle piece to show that multiplication and division are inverse (opposite) operations.

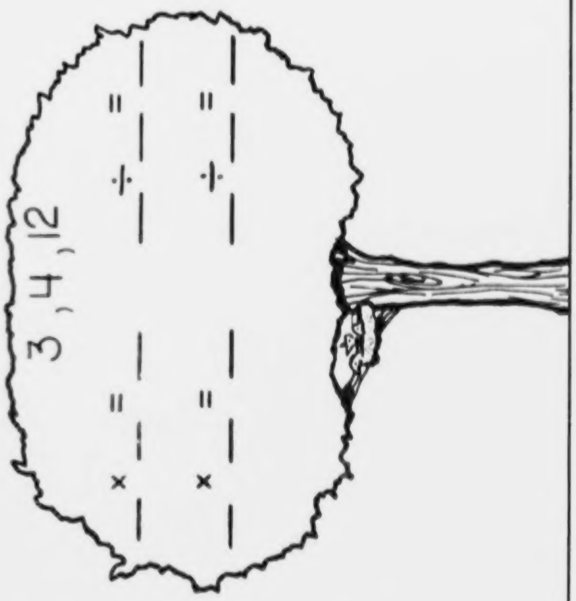

3 x 5 = 15
16 ÷ 4 = 4
3 x 4 = 12
10 ÷ 5 = 2
4 x 5 = 20
15 ÷ 3 = 5
2 x 3 = 6
8 ÷ 2 = 4
4 x 4 = 16
12 ÷ 3 = 4
2 x 4 = 8
6 ÷ 2 = 3
5 x 2 = 10
20 ÷ 4 = 5

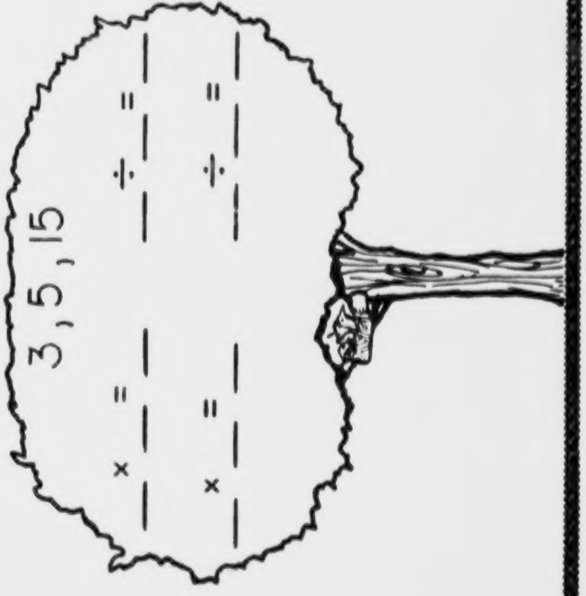
P.O. 2.05.06.03

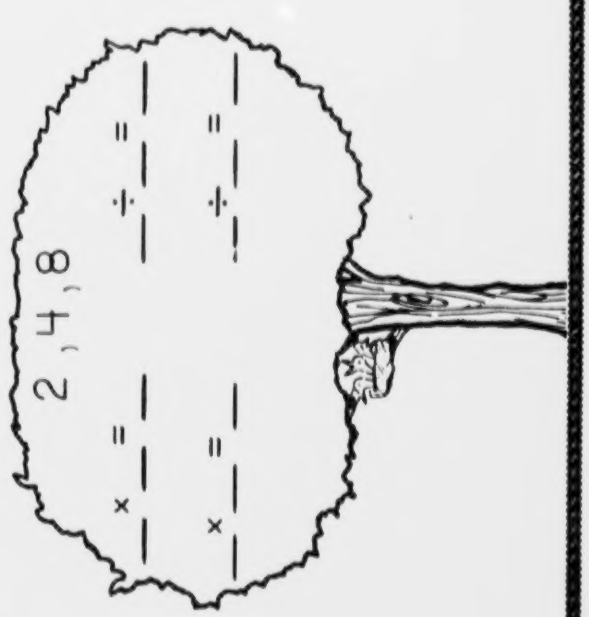
NAME:______________________________CLASS:__________DATE:________

Write related multiplication and division number sentences to complete each family tree.


5 , 2 , 10
5 × 2 = 10
10 ÷ 5 = 2
2 × 5 = 10
10 ÷ 2 = 5







2.12.04 ARRANGEMENTS OF 2 THROUGH 5 ITEMS

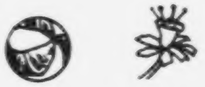
(2-3 lessons)

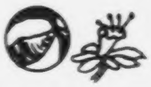
PERFORMANCE OBJECTIVES

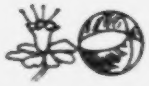
The student will be able to...

2.12.04.01B make arrangements of 2 through 5 items using all the items;

e.g.,







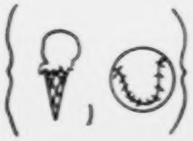
How many different ways could you arrange the ball and the flower?

2.12.04.02B define and identify subsets of a given set of objects;

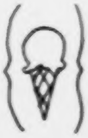
e.g.,

These are some subsets of SET A.

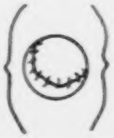
Set A



Set B



Set C



Set D

{ }

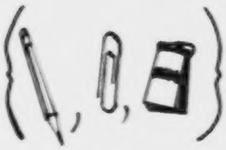
Sets A,B,C,and D are subsets of Set A.

2.12.04.03B make subsets of 1 or 2 objects from sets of 3 or 4 concrete objects.

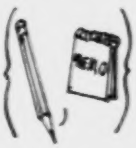
e.g.,

These are some subsets of Set E.

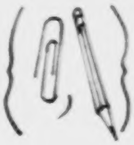
Set E



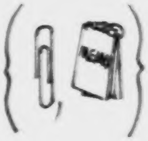
Set F



Set G



Set H



2.12.04

VOCABULARY

TERMS

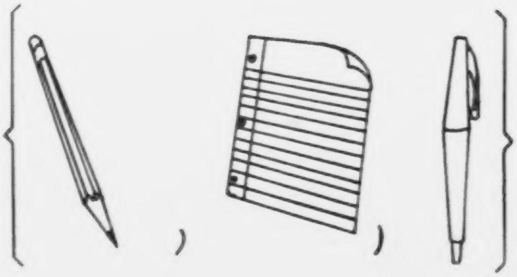
sets
subsets
arrangements

GETTING STARTED

Prepare several objects, e.g., notebook paper, crayon, pencil, pen. Display the crayon, paper and pen. Say, "This is a set of objects used for writing. Who remembers what a set is?" Elicit from the students that a set is a group of items. Draw the set of objects on the chalkboard.

e.g.,

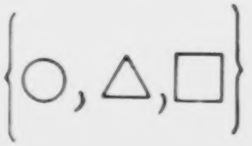
Set of objects used for writing =

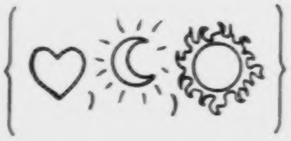


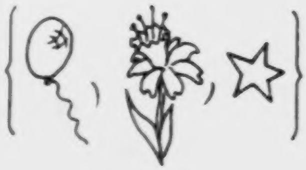
Review the symbol, { } used to represent a set. Ask several students to make different sets by using the objects on display or other objects in the classroom.

Prepare and display pictures of three different sets.

e.g.,







Point to the brackets and say, "The items inside the brackets are members of each set. What items are in the first set? . . . the second set? . . . the third set? Which sets have the same number of items? Do any of the sets have the same items? Which set has the most items?"

2.12.04

2.12.04.01 **make arrangements of 2 through 5 items using all the items**

STRATEGY 1: Prepare and display a flannel board and cutouts of the letters T, O, and N. Say, "We want to arrange these letters in as many ways as possible. How are they displayed now?" (T, O, N) Ask a student to write TON on the chalkboard. Ask another student to rearrange the felt letters in a different sequence on the flannel board and then record that sequence on the chalkboard. Repeat this procedure until all possible arrangements have been made.

e.g.,

TON TNO OTN
ONT NTO NOT

Say, "How many arrangements were we able to make? (6) How many of these arrangements are words?" (2, NOT and TON)

Repeat this procedure with cutouts of other letters or objects in sets of 2 through 5 items

Note: Not all possible arrangements are expected to be discovered for 4 items or 5 items as there are 24 and 120 arrangements respectively.

STRATEGY 2: Prepare and distribute play money (pennies, nickels, and dimes) to each student or group of students. Display one of each type of coin and ask the students to identify them. Say, "Jose went to the fruit store. He gave the man a penny, a nickel, and a dime. Take a penny, a nickel, and a dime and place them on your desk in that order." Write penny, nickel, and dime on the chalkboard. Say, "In what other order could Jose have given the coins to the man? Show your coins in a different

STRATEGY 2: cont'd

order." As the students rearrange the coins ask them to describe their arrangements. Record each arrangement on the chalkboard. Repeat this procedure until all possible arrangements have been made. Say, "How many arrangements were we able to make? (6) Did we change the type or number of coins? (No.) What was the only thing that changed?" (the order of the coins)

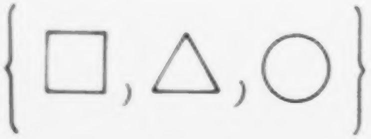
Repeat this procedure with 2 coins (penny, nickel), 4 coins (penny, nickel, dime, quarter), and 5 coins (penny, nickel, dime, quarter, half-dollar).

See **Note** for Strategy 1 , P.O. 2.12.04.01

2.12.04.02 **define and identify subsets of a given set of objects**

STRATEGY 1: Prepare and display a flannel board, felt brackets, and various felt shapes. Display a set of objects on the flannel board.

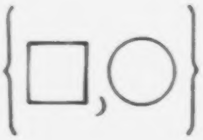
e.g.,



Set A

Ask a student to identify the objects in Set A. Display another set having two of the same items that are in Set A.

e.g.,

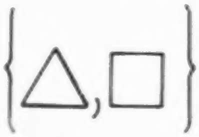


Set B

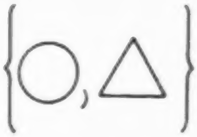
STRATEGY 1: cont'd

Ask the students to identify the objects in Set B. Say, "How are these two sets alike? (Both of the objects in Set B are included in Set A.) When all the objects in one set are included in another set, we say it is a subset of the larger set." Ask the students to identify other subsets which could be made from Set A.

e.g.



Set C



Set D

Repeat this procedure using other sets.

Variation: Use colored cubes, crayons, books, and other items found in the classroom in place of the flannel board and felt objects.

2.12.04.03 **make subsets of 1 or 2 objects from sets of 3 or 4 concrete objects**

STRATEGY 1: Prepare and display a box containing several red, yellow, and blue blocks and a set of 3 blocks, one red, one yellow and one blue. Point to the set of 3 blocks and say, "This is Set A." Ask a student to describe the objects in Set A. (a red, a yellow, and a blue block) Ask a student to choose blocks from the box to form a subset of Set A, e.g., a red block and a yellow block.

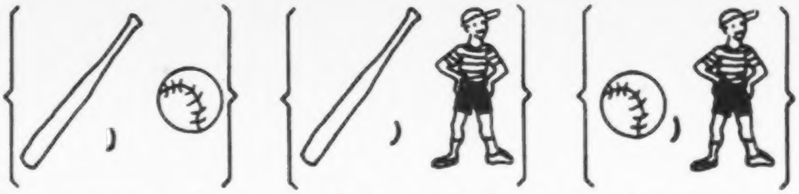
Repeat this procedure until the students have formed subsets of 1 or 2 blocks, or a subset with no blocks at all (empty set).

STRATEGY 2: Prepare and display on a flannel board, a set containing felt cutouts of a bat, a ball, a boy,

STRATEGY 2: cont'd

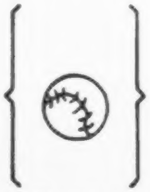
and brackets. Say, "How many objects are in this set? (3) What are they? Who can make a subset using only two of these objects?"

e.g.,



Say, "Who can make a smaller subset from the larger set?"

e.g.,



Repeat this procedure using other sets.

P.O. 2.12.04.01

NAME: ____________________ CLASS: ________ DATE: ________

Use the space below to show as many arrangements of the ○, △, and □ as possible.

○ △ □

DO YOU REMEMBER?

Sally used a dozen eggs to bake brownies.
Ernie used a half dozen eggs to bake cookies.
How many more eggs did Sally use than Ernie?

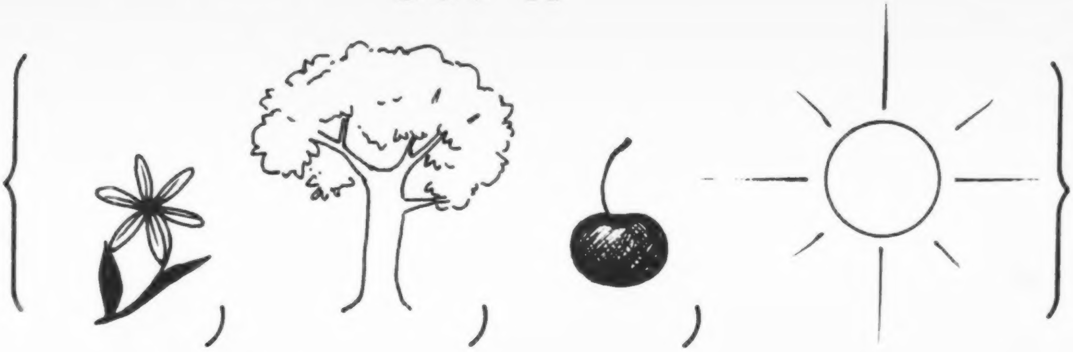
__________ eggs

P.O. 2.12.04.02

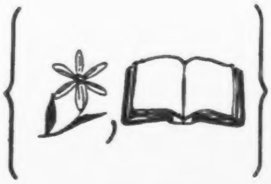
NAME:____________________ CLASS:________ DATE:________

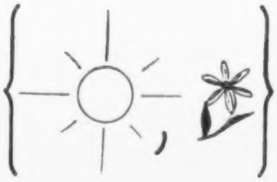
Follow the directions below.

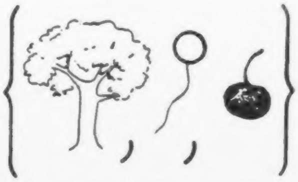
Set A



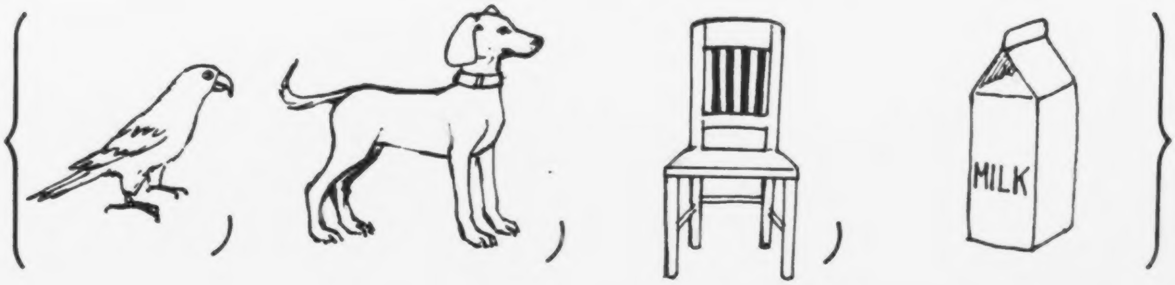
Draw a ring around the subset of Set A.



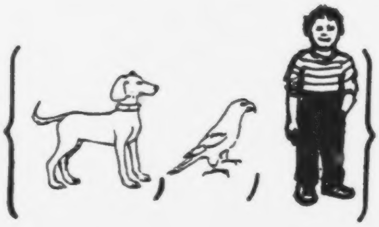


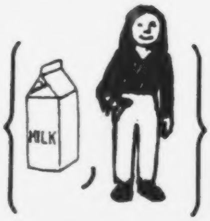


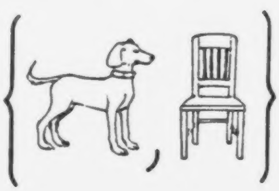
Set B



Draw a ring around the subset of Set B.



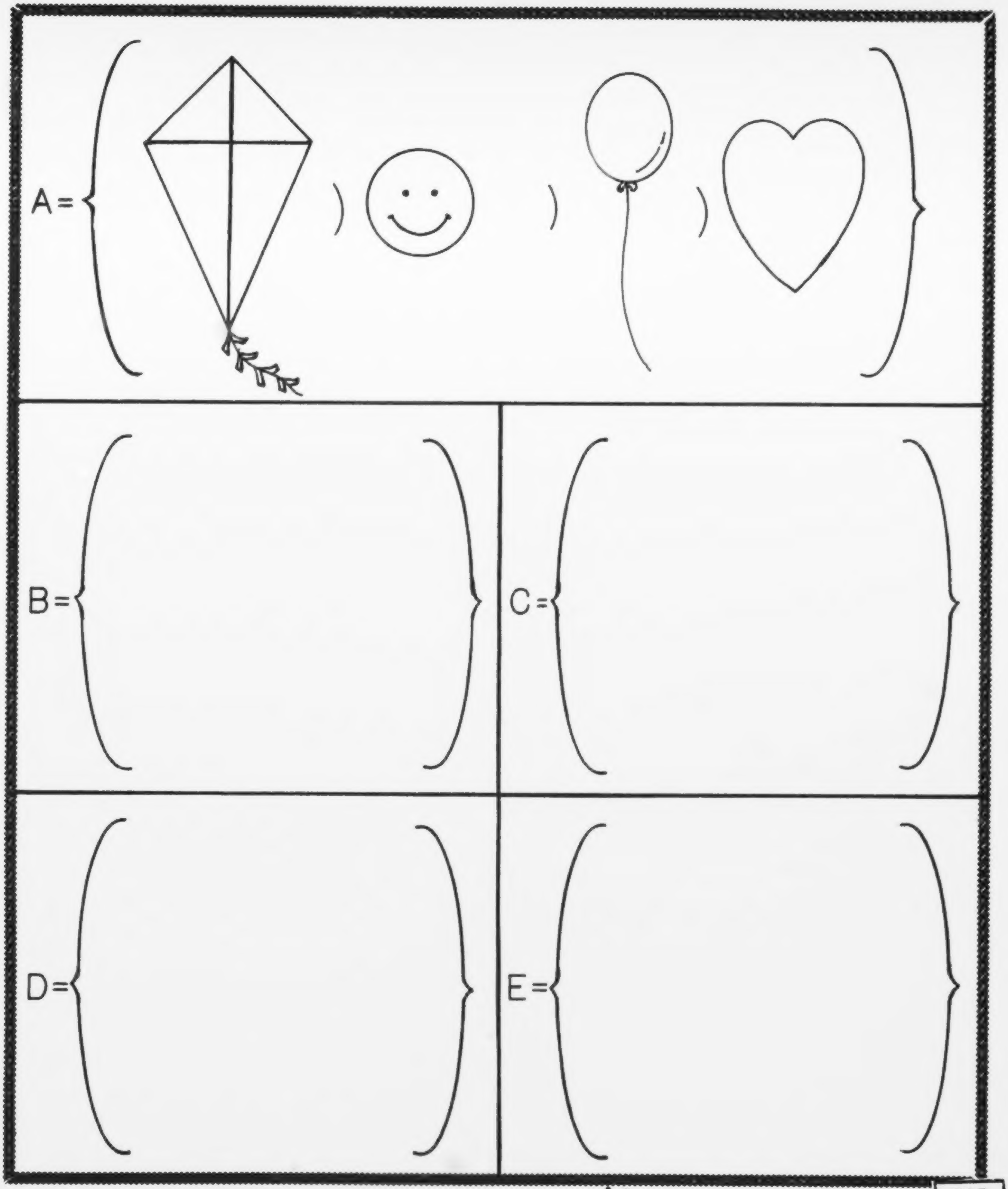




P.O. 2.12.04.03

NAME: ______________________ CLASS: ________ DATE: ________

Look at Set A. Draw four different subsets of Set A.



2.12.05 RATIO - 2:1 CORRESPONDENCE

(1 lesson)

PERFORMANCE OBJECTIVES

The student will be able to...

2.12.05.01B use two-to-one correspondence to develop the concept of ratio;

e.g.,

2 eyes - 1 person
2 long ears - 1 rabbit

2.12.05.02B use a chart to show ratio.

e.g.,

number of sandwiches	1	2	3	4	5
slices of bread	2	4	6	8	10

number of bicycles	1	2	3	4	5
number of wheels	2	4	6	8	10

VOCABULARY

TERMS

ratio
two-to-one correspondence
chart

GETTING STARTED

Prepare two groups of objects; one group with three pencils and the other group with four crayons. Say, "Here are two groups. How can we find out which set has more objects without counting each object?" Discuss various possibilities such as matching one pencil to one crayon. Demonstrate. Ask the students to match the remaining pencils and crayons. Say, "How many pencils are left? (0) How many crayons are left? (1) We discovered which set had more by matching the objects."

Repeat this procedure using other groups of objects.

During snack time, prepare straws, cookies, napkins, and milk for each student. Ask several students to distribute one of each item to each student. Say, "How many straws are in each container of milk? (1) There is one straw for each milk container. There are the same number of straws and milk containers because when we matched them to each other none were left over."

Repeat this procedure using the cookies and napkins.

2.12.05

2.12.05.01 **use two-to-one correspondence to develop the concept of ratio**

STRATEGY 1: Ask 9 students to stand. Say to one of them, "John, please stand here on the left side of the room. Stephen and Jane, please stand here on the right side of the room. How many students were asked to stand on the left side of the room at one time? (1) How many students were asked to stand on the right side of the room at one time?" (2) Repeat this procedure until nine students are standing in front of the room; three on the left side and six on the right side. Say, "This pattern shows a comparison between the number of students on the right to the number of students on the left, a two-to-one correspondence, or a ratio of 2 to 1." Write the word ratio on the chalkboard. Say, "For every 2 students on the right, there is 1 student on the left. If we add 1 more student to the left, how many students must we add to the right?" (2)

Repeat this procedure using concrete objects to demonstrate two-to-one correspondence.

STRATEGY 2: Prepare and display a picture of a bicycle. Say, "How many bicycles are in this picture? (1) How many wheels does the bicycle have?" (2) Display a picture of two bicycles. Say, "How many bicycles do you see? (2) How many wheels are there all together? (4) If there were three bicycles, how many wheels would there be all together? (6) These pictures show a comparison between the number of wheels on a bicycle to the number of bicycles, a two-to-one correspondence, or a ratio of 2 to 1 because there are 2 wheels for every 1 bicycle."

STRATEGY 2: cont'd

Write the word ratio on the chalkboard. Say, "What are other examples of a two-to-one correspondence or 2 to 1 ratio?" (two faucets to one sink, two slices of bread to one sandwich, two shoes to one pair, two eyes to one face.)

2.12.05.02 **use a chart to show ratio**

STRATEGY 1: Display a chart showing a ratio of two-to-one.

e.g.,

number of wheels	2	4	6	8				
number of bicycles	1	2	3	4				

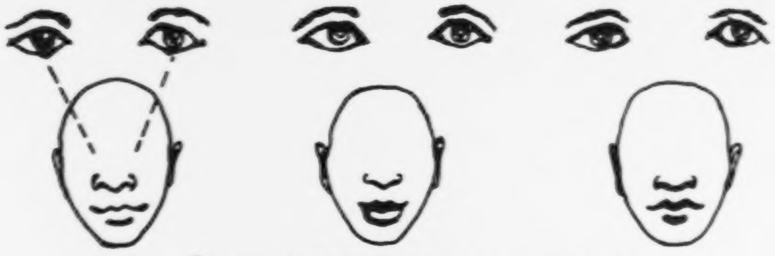
Say, "This chart shows a two-to-one correspondence or a ratio of 2 to 1. There are 2 wheels for each bicycle. Let's complete the chart. Does the two-to-one ratio change as the numbers get larger? (No.) Explain." Ask the students to copy the chart into their notebooks and to fill in the blank spaces. Emphasize the need to correctly label the chart.

Repeat this procedure using another example of a two-to-one ratio.

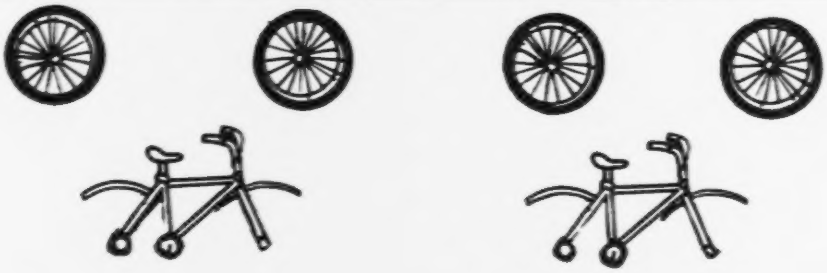
P.O. 2.12.05.01

NAME:__________ **CLASS:**__________ **DATE:**__________

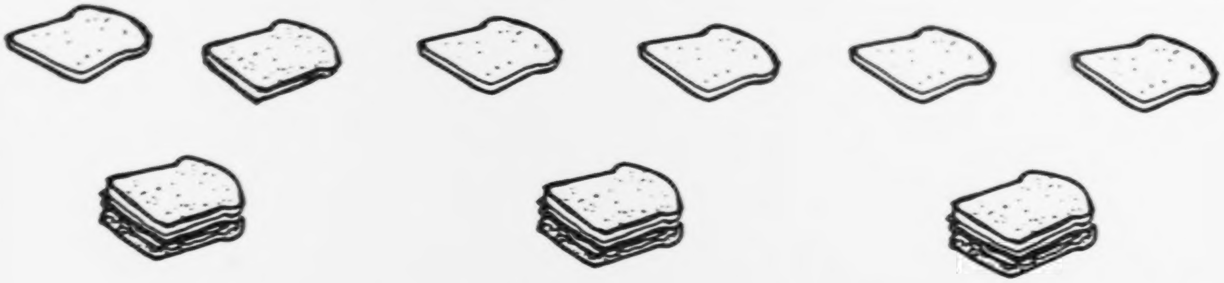
Draw lines to show the two-to-one ratio in each group.



2 EYES TO 1 FACE



___ WHEELS TO ___ BICYCLE



___ SLICES TO ___ SANDWICHES

DO YOU REMEMBER?

Look at the number family. 3, 4, 12

Write two multiplication sentences and two division sentences using these numbers.

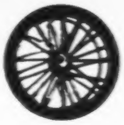
___ X ___ = ☐ ___ ÷ ___ = ☐

___ X ___ = ☐ ___ ÷ ___ = ☐

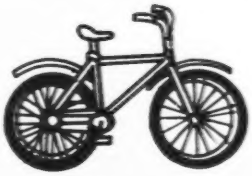
P.O. 2.12.05.02

NAME: ______________________ CLASS: ________ DATE: ________

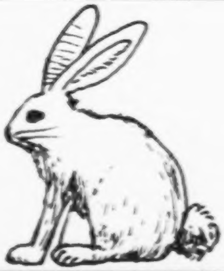
Complete each chart to show a two-to-one ratio.

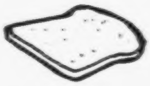


number of wheels	2	4	6		
number of bicycles	1	2	3		

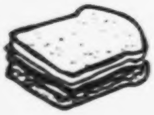


number of ears	2	4			
number of rabbits	1	2		4	





slices of bread	2		6	8	
number of sandwiches	1		3		



2.13.05 MISSING INFORMATION

(2-3 lessons)

PERFORMANCE OBJECTIVES

The student will be able to...

2.13.05.01A determine whether sufficient information exists to solve a problem;
e.g.,

> Jovita gave 3 apples to each friend. How many apples did she give away?

2.13.05.02A supply missing information to solve a problem.
e.g.,

> Marvin bought 2 boxes of pencils. How many pencils did he buy in all?
>
> What information is needed to solve this problem?

437

2.13.05

VOCABULARY

TERMS
information

GETTING STARTED

Prepare and distribute envelopes containing ten counting chips to each student. Say, "Ann bought an ice cream cone with 2 scoops of ice cream. Her brother bought an ice cream cone with 3 scoops of ice cream. How many scoops did they both buy? Use your chips to show how many scoops Ann bought. Use your chips to show how many scoops her brother bought." Ask a student to write a number sentence for this story on the chalkboard. (2 + 3 = 5)

Repeat this procedure, using chips and writing number sentences for story problems.

Write several number sentences on the chalkboard in both horizontal and vertical formats.

e.g.,

$\begin{array}{r}7\\ \underline{+3}\end{array}$ $\quad 3 \times 2 = \square \quad$ $\begin{array}{r}5\\ \underline{-4}\end{array}$ $\quad 0 + 4 = \square \quad 4 + 4 = \square$

Say, "I will tell you a story. See if you can find a number sentence on the chalkboard that represents the story. Seven boys were playing ball. Three boys joined them. How many boys played ball in all? Which number sentence tell you about the story? How can you tell?" Ask a student to draw a ring around it, e.g., $\bigcirc\!\!\begin{array}{r}7.\\ \underline{+3}\end{array}$

Repeat this procedure with other story problems.

e.g.,

a) Mr. Cohen owns 2 cars. Each car needs 4 new tires. How many tires will Mr. Cohen buy?

b) Bob was walking down the street. His pockets were empty. Bob found 4 pennies and he put them in his pocket. How many pennies are in Bob's pocket now?

c) At the zoo I saw 5 lions and 4 tigers. How many more lions than tigers did I see?

d) Mrs. Johnson gave 3 students 2 pencils each. How many pencils did Mrs. Johnson give to the 3 students?

2.13.05

2.13.05.01 **determine whether sufficient information exists to solve a problem**

STRATEGY 1: On the chalkboard write a story problem with insufficient information to solve it.

e.g.,

Susan gave her friends 4 flowers each.
How many flowers did she give away?

Say, "What did Susan give away? (flowers) How many flowers did she give to each friend? (4) How many flowers did she give away? (The question can't be answered.) Why? To solve a problem, we must have enough information. Let's look at other problems and decide if we have enough information to solve them." Provide additional problems, some with and some without sufficient information to solve them. Say, "Which problems cannot be solved? What information is needed to solve them?"

STRATEGY 2: Prepare several cards with a story problem written on each card. Omit pertinent information from some of the cards.

e.g.,

Toby's desk measures 9 decimeters long.
Rob's desk measures 7 decimeters long.
How much shorter is Rob's desk than Toby's?

Sal counted 16 books on the top shelf.
How many books were there on both shelves?

Distribute the cards to several students. Ask a student to read his/her card to the class. Say, "What information is given? What do you want to find out? Do you have enough information to solve the problem? Can you

STRATEGY 2: cont'd

write a number sentence to solve the problem?"

Repeat this procedure to determine whether sufficient information exists to solve each problem.

2.13.05.02 supply missing information to solve a problem

STRATEGY 1: Prepare and display 2 cans, each containing a different number of chips. Say, "John has 2 cans of chips. How many chips does he have in all? What information is given? What do you want to find? Can this problem be solved with the information given? (No) Why?" (We know that John has 2 cans of chips and we want to know how many chips he has in both cans. We don't know the number of chips in each can.) Ask a student to count the chips in each can, retell the problem, and supply the missing information.

e.g.,

> John has 2 cans of chips. One can has 47 chips and the other can has 39 chips. How many chips does John have in all?

Ask a student to write the number sentence on the chalkboard that may be used to solve the problem and then to solve the problem.

Repeat this procedure using other problems which require additional information to solve.

STRATEGY 2: Write several problems on the chalkboard, each with information missing.

STRATEGY 2: cont'd

e.g.,

Six bears went over the mountain on Monday. Five bears went over the mountain on Tuesday. How many bears went over the mountain on Monday, Tuesday, and Wednesday?

Fourteen bears went over the mountain on Friday. How many more bears went over the mountain on Saturday?

Every day for 5 days bears went over the mountain. How many bears went over the mountain in 5 days?

Prepare cards containing the missing information for each problem.

e.g.,

Three bears went over the mountain on Wednesday.

Eighteen bears went over the mountain on Saturday.

Two bears went over the mountain each day.

Ask a student to read the first problem aloud. Say, "What information is missing? Who can find the card that has the missing information? Place the card with the missing information on the chalkboard ledge under the problem." Ask a student

STRATEGY 2: cont'd

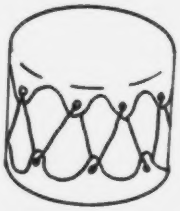
to reword the problem, placing the missing information in the correct place so the problem can be solved.

Repeat this procedure until all the problems have been matched with their missing information.

P.O. 2.13.05.01

NAME: ______________________ CLASS: ________ DATE: ________

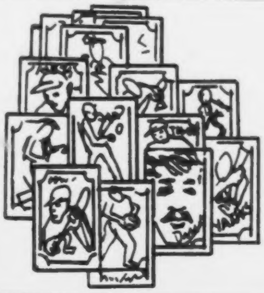
Do you have enough information to solve each problem?
Circle Yes or No.



There are 4 red drums and 6 blue drums. How many drums in all?

Yes

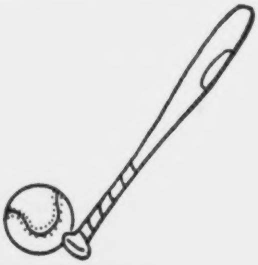
No



Tom has 30 baseball cards. He gave some to Jim. How many does he have left?

Yes

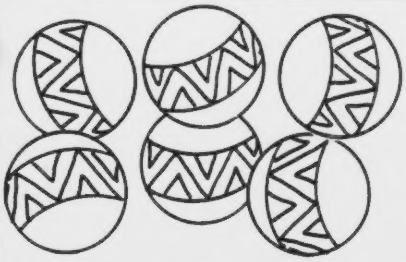
No



Peter played ball with his friends for 2 hours. What time did he stop playing?

Yes

No



Jan had 6 beach balls. She gave 3 of them away. How many did she have left?

Yes

No

DO YOU REMEMBER?

1 pint = ______ cups

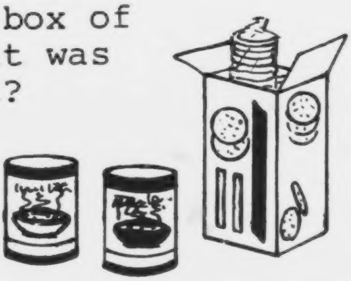
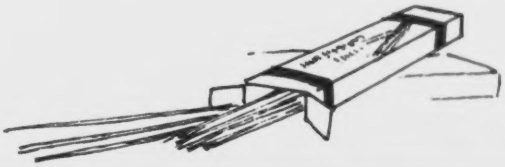
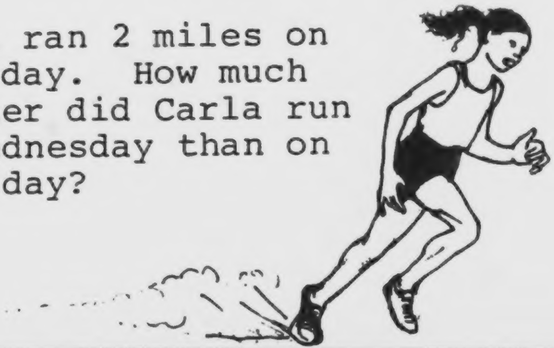
1 quart = ______ cups

1 quart = ______ pints

P.O. 2.13.05.02

NAME:______________________ CLASS:________ DATE:________

The problems below cannot be solved because more information is needed. Circle the information that would be needed to solve each problem.

Tanya bought 2 cans of soup and 1 box of crackers. What was the total cost?		The soup cost 50¢ each and the crackers cost 40¢. She saved 35¢ on crackers.
Robert likes bananas. How many bananas does he eat in 4 days?		He eats 2 bananas each day. He eats bananas every day.
John bought spaghetti. He gave the clerk 75¢ How much change did he get?		He also bought cheese for $1.00. The spaghetti cost 59¢.
Carla ran 2 miles on Thursday. How much farther did Carla run on Wednesday than on Thursday?		She ran 4 miles on Wednesday. She ran faster on Wednesday.

2.10.14 DECILITER

(1 lesson)

PERFORMANCE OBJECTIVES

The student will be able to...

2.10.14.01C identify relationships between a liter and a deciliter;

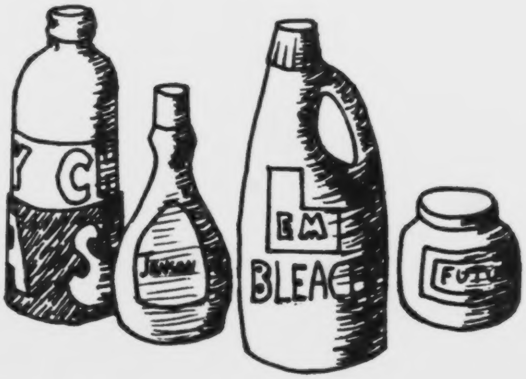
e.g.,

A deciliter is one-tenth of a liter.

10 deciliters = 1 liter

*2.10.14.02A estimate and measure capacity using different metric units.

e.g.,



How many deciliters will each container hold?

2.10.14

VOCABULARY

TERMS

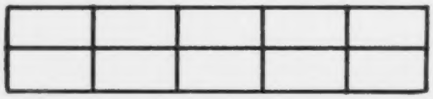
liter
deciliter

GETTING STARTED

Prepare and display three containers of the same size. Fill one container to the top, one container half full, and leave the third container empty. Say, "Which container is full? Which container is empty? Which container is half full?"

Repeat this procedure until all of the students have had a turn.

Draw a rectangle divided into ten equal parts on the chalkboard. e.g.,



Say, "Into how many parts has this rectangle been divided? (10) What name shall we give to one of the parts? ($\frac{1}{10}$) ...two of the parts? ($\frac{2}{10}$) ...six of the parts? ($\frac{6}{10}$) ...ten of the parts?" ($\frac{10}{10}$ or one whole)

2.10.14

2.10.14.01 identify relationships between a liter and a deciliter

STRATEGY 1: Prepare and display a liter container filled with water, a deciliter container, and a large basin or pitcher. Point to the liter container and say, "This container holds one liter of water." Point to the deciliter container and say, "This container will hold one deciliter of water. How many times do you think we will be able to fill this deciliter container from the liter container?" Record the estimates. Fill the deciliter container. Say, "We have filled one deciliter." Empty the water from the deciliter container into the basin or pitcher and fill it a second time. Ask the students to count each time you refill the deciliter container. When all the water has been poured say, "How many deciliters were we able to fill from one liter of water?" (10) Write 10 deciliters = 1 liter on the chalkboard.

Hold up the deciliter container. Say, "We found out that 10 deciliters equal one liter. What part of a liter is one deciliter?" ($\frac{1}{10}$ of a liter) Write 1 deciliter = $\frac{1}{10}$ of a liter on the chalkboard.

Hint: A deciliter container can be made by using a clear plastic cup, a teaspoon, and water. Pour 20 teaspoons of water into the clear plastic cup. Using a dark colored marker, draw a line indicating the level of the water. The amount of water up to that line is about one deciliter.

STRATEGY 2: Prepare and display a pitcher of water, a deciliter container, and a liter container. (See **Hint** in

STRATEGY 2: cont'd

Strategy 1 for marking a deciliter container.) Display the deciliter container and say, "This container can hold 1 deciliter of liquid. Is a deciliter more or less than a liter? (less) How many deciliters do you think it will take to fill the liter container?" Fill the deciliter container and ask a student to pour it into the liter container. Ask another student to write 1 on the chalkboard. As students take turns pouring deciliters of water into the liter container, the student at the chalkboard will keep a tally of how many deciliters have been poured. When the liter container is filled say, "How many deciliters did it take to fill the liter container?" (10) Write 10 deciliters = 1 liter on the chalkboard. Say, "Since it takes 10 deciliters to fill one liter, what part of a liter is a deciliter?" ($\frac{1}{10}$) Write 1 deciliter = $\frac{1}{10}$ of a liter on the chalkboard.

2.10.14.02 **estimate and measure capacity using different metric units**

STRATEGY 1: Prepare and display a liter container, a deciliter container, containers of various sizes, a funnel, and water. Say, "We are going to find out how many liters or deciliters it will take to fill each of these other containers." Hold up the liter container and a larger container, e.g., a plastic two liter soda bottle. Say, "How many liters do you think it will take to fill this larger bottle?" Record the estimates. Fill the liter container. Ask a student to pour the water from the container into the larger bottle using the funnel. After the larger bottle has been filled, record the actual measurement on the chalkboard and compare it to

STRATEGY 1: cont'd

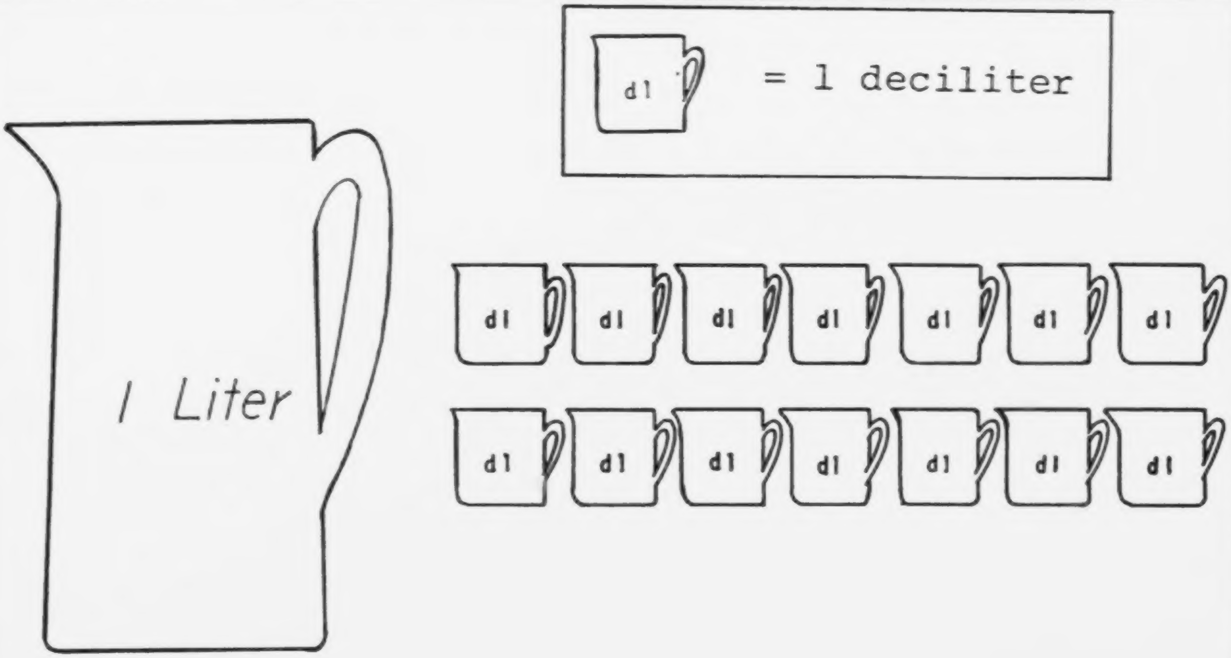
the estimates. Say, "Whose estimate was closest?"

Repeat this procedure using liter and deciliter containers as the units of measure.

P.O. 2.10.14.01

NAME:______________________________ CLASS:_________ DATE:_______

Circle the number of deciliters equal to 1 liter.
Then complete the sentences below.

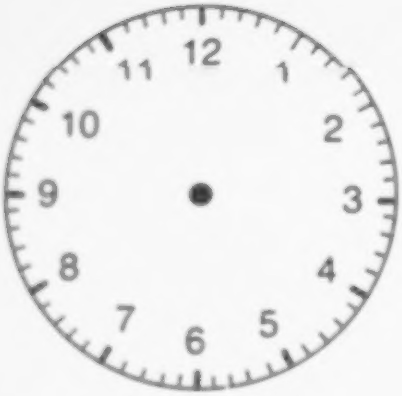

dl
= 1 deciliter
1 Liter
dl dl dl dl dl dl dl
dl dl dl dl dl dl dl

One liter is equal to _______ deciliters.

Two liters equal ______ deciliters.

A deciliter is what fractional part of a liter? _________

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday


12
1
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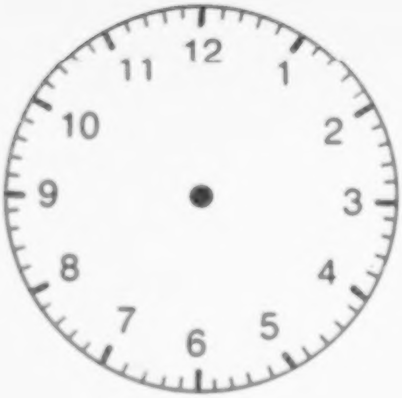
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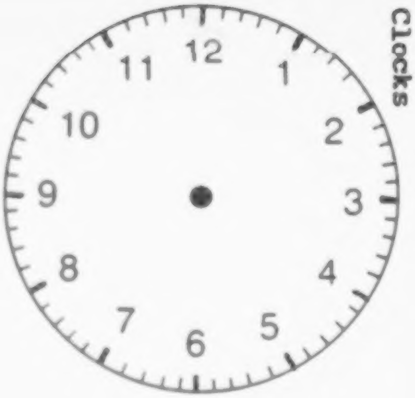
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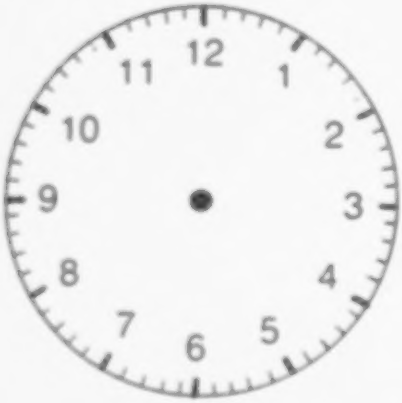
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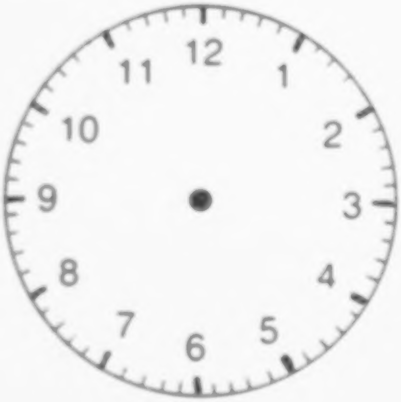
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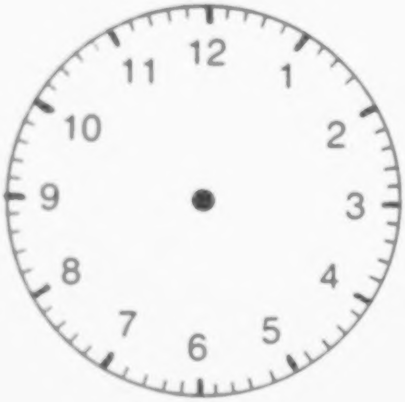
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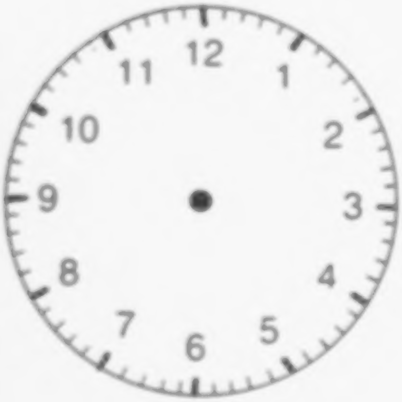
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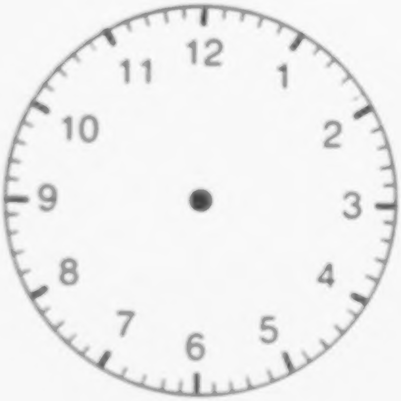
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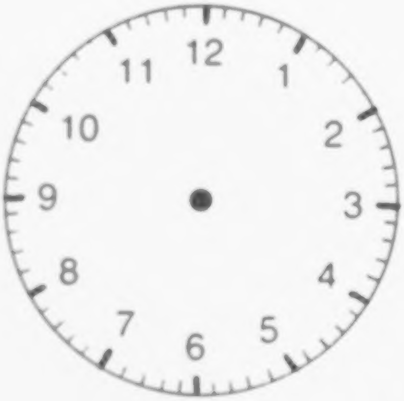
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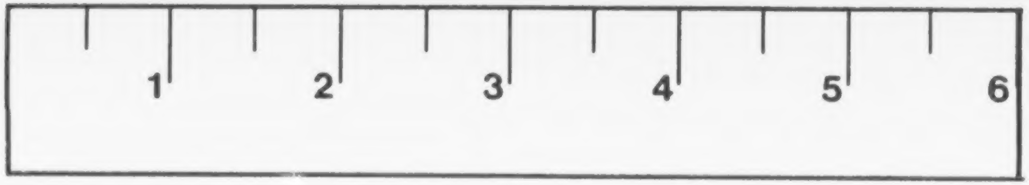

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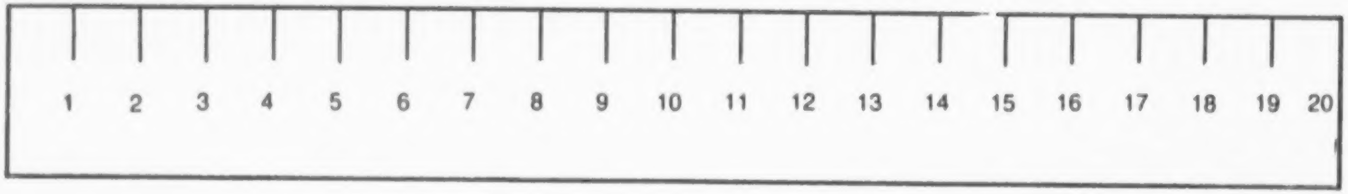
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RESOURCE MATERIAL - Rulers

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11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
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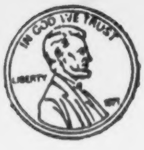
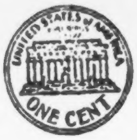
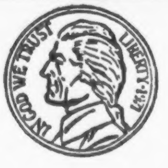
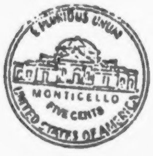
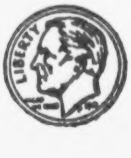
91	92	93	94	95	96	97	98	99	100

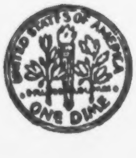




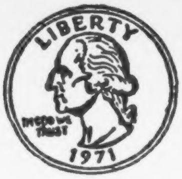


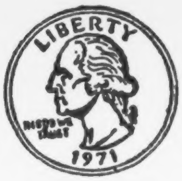


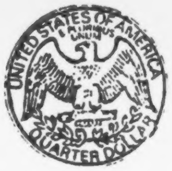


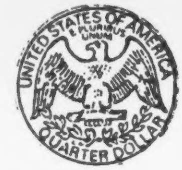


RESOURCE MATERIAL - Money (2)


LIBERTY
IN GOD WE TRUST
1971


LIBERTY
IN GOD WE TRUST
1971


UNITED STATES OF AMERICA
E PLURIBUS UNUM
QUARTER DOLLAR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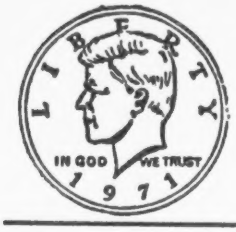
E PLURIBUS UNUM
QUARTER DOLLAR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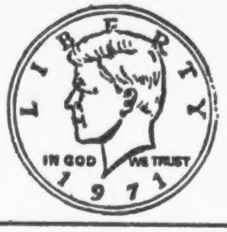
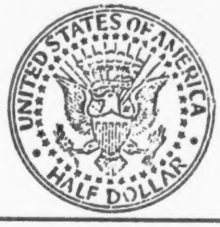
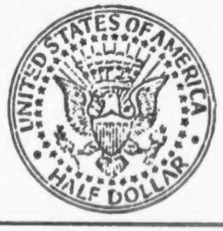
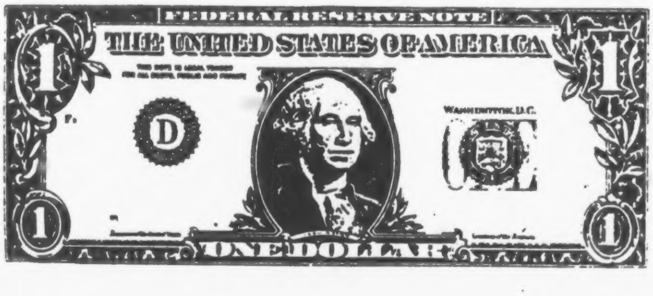
IN GOD WE TRUST
1971


LIBERTY
IN GOD WE TRUST
1971


UNITED STATES OF AMERICA
HALF DOLLAR


UNITED STATES OF AMERICA
HALF DOLLAR


FEDERAL RESERVE NOTE
THE UNITED STATES OF AMERICA
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WASHINGTON, D.C.
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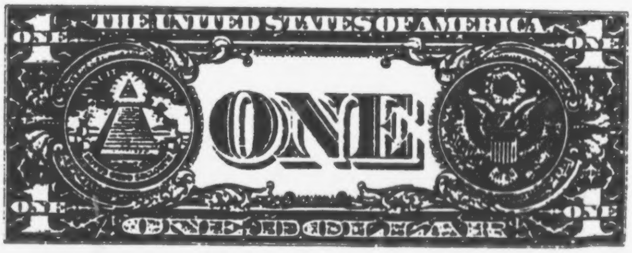
THE UNITED STATES OF AMERICA
ONE
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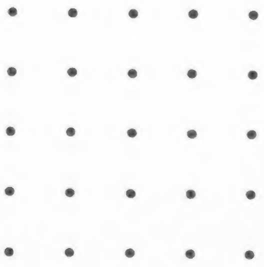
ONE DOLLAR

RESOURCE MATERIAL - Dot Paper (1) Geometry

RESOURCE MATERIAL - Dot Paper (2) Geometry



RESOURCE MATERIAL - Graph Paper

TABLE OF SYMBOLS

DEFINITIONS	SYMBOL	DEFINITIONS	SYMBOL
plus; add; positive	+	line	↔
minus; subtract; negative	-	ray	→
plus or minus	+ or -	perpendicular lines	⊥
times; multiply	· or X	parallel lines	∥
divide	÷	degree	°
divide	⟌	equals	=
square root	√	is not equal to	≠
cube root	∛	is less than	<
angle	∡	is greater than	>
between two numerals or letters at the end of a series or sequence; and so on	...	encloses a set when numbers are included: empty set when empty	{ }
		subset	⊂
triangle	△	intersection	∩
rectangle	▭	union; join	∪
parallelogram	▱	percent	%
circle	⊙	foot, minute	'
		inch, second	"
line segment (as $\overline{AB}$)	—		

METRIC TABLE

PREFIX	VALUE	LENGTH	CAPACITY	WEIGHT (MASS)
KILO	1000	kilometer* (km)	kiloliter (kl)	kilogram* (kg)
HECTO	100	hectometer (hm)	hectoliter (hl)	hectogram (hg)
DEKA	10	dekameter (dam)	dekaliter (dal)	dekagram (dag)
	1	meter* (m)	liter* (l)	gram* (g)
DECI	$\frac{1}{10}$ or .10	decimeter (dm)	deciliter (dl)	decigram (dg)
CENTI	$\frac{1}{100}$ or .01	centimeter* (cm)	centiliter (cl)	centigram (cg)
MILLI	$\frac{1}{1000}$ or .001	millimeter* (mm)	milliliter (ml)	milligram* (mg)

* most frequently used

BASIC CLASSROOM EQUIPMENT CHECKLIST

MATERIALS:

Abacus - Class size/indiv....... ____
Attribute blocks................ ____
Balance Beam.................... ____
Calculators..................... ____
Calendar - class size........... ____
Clock - large - class size...... ____
Clock - individual size......... ____
Clock - stamp................... ____
Coin stamps..................... ____
Compass......................... ____
Cubic counting blocks........... ____
Cuisenaire rods................. ____
Dominoes........................ ____
Felt cut-outs................... ____
Flannel board................... ____
Flash cards..................... ____
Fractional parts (assorted)..... ____
Geo boards...................... ____
Geometric patterns.............. ____
Hundred charts - class size/ind. ____
Interlocking cubes.............. ____
Laminating paper................ ____
Magnetic board.................. ____
Magnetic discs.................. ____
Measuring tools-English, Metric (rulers, scales, compasses, protractors, beakers, cups, spoons, thermometers).......... ____
Number lines - class/indiv...... ____
Numerals - tactile.............. ____
Plastic discs................... ____
Play money...................... ____
Powers of Ten................... ____
Protractor...................... ____
SEE calculators................. ____
Scale........................... ____
Screen (pull-down type)......... ____
Spinners........................ ____
Squared place value material.... ____
Standard playing cards.......... ____
Tangrams........................ ____
Tens frame...................... ____
Timers (1,2,3 minute)........... ____
Tokens (various sizes/colors)... ____
Trundle wheel................... ____

SUPPLIES:

Adding machine tapes (for classroom/ind. number lines)...... ____
Chalk........................... ____
Construction paper.............. ____
Elastic bands................... ____

BASIC CLASSROOM EQUIPMENT CHECKLIST

SUPPLIES: cont'd

Envelopes (all sizes).......... ____
Erasers, board/individual...... ____
Felt pens (all sizes).......... ____
Ditto, Rexograph paper......... ____
Glue........................... ____
Gram weights................... ____
Graph paper (1 cm, <, 1")...... ____
Grease pencils................. ____
Oak tag........................ ____
Paper clips.................... ____
Paste.......................... ____
Plastic discs.................. ____
Pointer........................ ____
Primary pencils................ ____
Rubber bands................... ____
Scissors - primary, left hand.. ____
Scotch tape.................... ____
Spinner........................ ____
String......................... ____
Tape........................... ____

COLLECTIBLES:

Beads and beans................ ____
Bottle caps.................... ____
Buttons........................ ____
Cardboard (all sizes).......... ____
Cereal boxes................... ____
Coffee cans.................... ____
Detergent boxes, shoe boxes, meat trays, and plastic containers.................. ____
Egg cartons.................... ____
Felt for desk mats............. ____
Ice cream sticks............... ____
Juice containers............... ____
Macaroni....................... ____
Magazines...................... ____
Menus.......................... ____
Metrically measured cartons.... ____
Milk containers................ ____
Newspapers..................... ____
Paper plates................... ____
Sand........................... ____
Spools......................... ____
String, yarn................... ____
Styrofoam...................... ____
Tongue depressors.............. ____
Wire hangers................... ____
Ziploc Bags.................... ____